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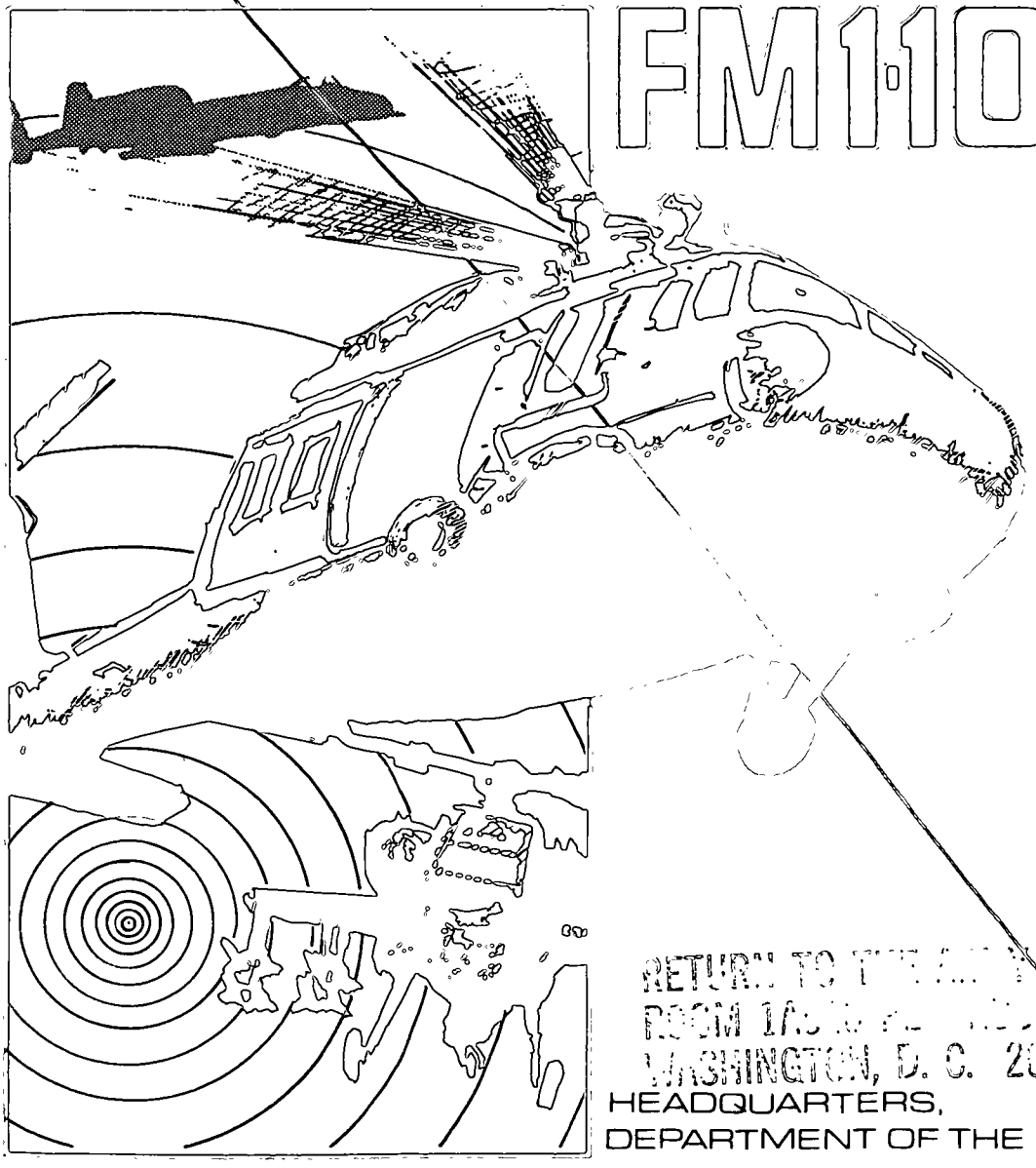
AIRSPACE MANAGEMENT AND ARMY AIR TRAFFIC IN A COMBAT ZONE



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HEADQUARTERS,
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FIELD MANUAL
No. 1-103

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 30 December 1981

AIRSPACE MANAGEMENT AND ARMY AIR TRAFFIC IN A COMBAT ZONE

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*This manual supersedes FM 1-60, 30 September 1977.

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STATEMENT

When used in this publication, "he," "him," "his," and "men" represent both the masculine and feminine genders, unless otherwise specifically stated.

CHAPTER 1

INTRODUCTION

1-1. PURPOSE

a. The purpose of this manual is to provide information and guidance on the operational functions and procedures for Army airspace management and air traffic control in the combat zone. It provides the fundamentals to optimize Army unit operations—around-the-clock—in an airspace shared by friendly forces. Guidance is provided for maneuver force commanders, aviation unit commanders, air traffic control units, and individual pilots.

b. This manual has been written with the premise that special relationship must exist between US Army and other US Service component tactical forces. All commanders must recognize that all Service components need to use the airspace over the combat zone in the performance of their assigned missions and that airspace procedures must contribute to and not detract from the overall objective—EFFECTIVE COMBAT EMPLOYMENT OF THE JOINT FORCE.

c. Commanders are reminded that during peacetime operation they may be expected to apply environmentally dictated safety measures to their training. These precautions should be applied in a manner that continues to afford realistic training and insure mission accomplishment. (See chapter 6.)

1-2. SCOPE

a. This manual is primarily concerned with procedures necessary to exploit the mobility and effectiveness of aviation units in support of tactical operations by land combat forces in any area of operations.

b. Specifically, it provides doctrine and procedures for airspace management and air traffic control during Army land combat operations. Doctrine expressed has been developed in consonance with the needs of all other friendly airspace users. Readers should keep in mind that the objective of airspace management is to maximize joint combat effectiveness, in part, by capitalizing on the unique capabilities of aviation units. Procedures outlined are not intended to constrain these units' flexibility. They are simply commonsense measures that will ultimately enhance combat effectiveness and put maximum pressure on the enemy.

c. This manual is in consensus with and extends the policies, procedures, and doctrine contained within FM 100-42.

d. This publication implements STANAG 3805, and has been written in consonance with the following international standardization agreements:

STANAG 3631, *Wartime Air Movement Priority System for NATO Countries;* STANAG 3736, ATP-27B, *Offensive Air Support Operations;* and STANAG 3805, ATP-40, *Airspace Control in the Combat Zone.*

e. Appendix A contains a listing of additional related publications.

f. Standard definitions and abbreviations are contained in Army Regulations (AR) 310-25 and 310-50, respectively. Abbreviations and terms used in this manual which are not listed in the above-referenced ARs are explained in the text.

USER COMMENTS

This publication was written by the United States Army Aviation Center (USAAVNC). Users of this manual are encouraged to submit recommended changes or comments to improve the publication. Comments must be submitted on DA Form 2028 (Recommended Changes to Publications and Blank Forms), and should reference the specific page, paragraph, and sentence of the text to be changed. Reasons for each recommended change must be stated to allow complete evaluation and to insure understanding of the recommendation. Forward your comments, suggestions, or questions to Commander, USAAVNC, ATTN: ATZQ-T, Fort Rucker, AL 36362, or call the Aviation Center HOTLINE 24-hour recording service: AUTOVON 558-6487; Commercial—Area Code (205) 255-6487. During duty hours, call AUTOVON 558-3603/3217; Commercial—Area Code (205) 255-3603/3217. Additionally comments, suggestions, or questions pertaining to air traffic control procedures and operations should be forwarded to the Commander, USACC, ATTN: CC-ATC, Fort Huachuca, AZ 85613, or call AUTOVON 879-6793; Commercial—Area Code (602) 538-6793.

CHAPTER 2

CONCEPTS, RESPONSIBILITIES, AND PROCEDURES

2-1. CONCEPTS

a. As a fundamental consideration, the primary objective of airspace management and air traffic control (ATC) is to promote the safe, orderly, and expeditious use of airspace in the combat zone while contributing to maximum combat effectiveness and survivability. Efficient airspace management and air traffic control should enhance coordinated combat operations without adding undue restrictions and with minimal adverse impact on the capabilities of any component. Authority to approve, disapprove, or deny combat operations is vested only in the joint force commander.

b. Airspace management consists of the coordination, integration, regulation, and identification of the use/users of airspace of defined dimensions. In this context, coordination is that degree of authority necessary to achieve effective, efficient, and flexible use of airspace. Integration considers the necessity to consolidate requirements for the use of this airspace in the interest of achieving a common objective at the lowest possible level. Regulation indicates the requirement to supervise activities in this airspace to provide for flight safety and defines the authority required to insure such safety. Identification indicates the requirement to identify *all* friendly airspace users.

c. Air traffic control is a service provided within the combat zone to contribute to the maximization of combat effectiveness by promoting the safe, efficient, and flexible use of airspace. Air traffic control may be either positive, procedural, or a combination of both, depending on tactical needs and/or system capabilities.

2-2. RESPONSIBILITIES

a. In joint operations, the Air Force Component Commander/Commander, Air Force Forces (AFCC/COMAFFOR) will

AIRSPACE MANAGEMENT + **AIR TRAFFIC CONTROL** = **SAFE, ORDERLY USE OF AIRSPACE**

normally be designated the area air defense commander (AADC) and the airspace control authority (ACA) in accordance with provision of Joint Chiefs of Staff Publications 8 and 9.

(1) The ACA/AADC is responsible for—

- Air defense procedures and rules of engagement.
- The overall planning and operation of the airspace management system within the airspace control area.
- Issuing identification, friend or foe (radar) (IFF) procedures.
- Developing the area airspace control plan and issuing airspace management procedures.

(2) The area airspace control plan (fig 2-1) and airspace management procedures include—

- Airspace control boundaries.
- In-flight reporting.
- Control of all air traffic operating under instrument flight rules/instrument meteorological conditions (IFR/IMC).
- Coordination procedures for aircraft operating under visual flight rules/visual meteorological conditions (VFR/VMC).
- Procedures for integrating air operation information produced by component command and control systems into the airspace control system.
- Establishment of an airway structure and arrival, departure, en route, and handoff procedures when required for air traffic control.
- Establishment of airspace control sectors, airspace restrictions, and high density airspace control zones when required.
- Standardized formats for the exchange of airspace control information and coordination of airspace management activities (e.g., airspace restrictions, low-level transit routes (LLTR), and coordinating altitudes).

b. The US Army combat forces commander (normally corps) is responsible for airspace management functions within his area of territorial responsibility, as defined by the ACA. Subject to the operational command/control of the joint force commander, each component commander within the joint force has responsibility for the following:

- Tactical employment and internal administration of his own forces.
- Coordinating the operations of his forces, aircraft, and weapons with other Service components, as required.
- Employment of air defense weapon systems in accordance with the policies and procedures issued by the AADC.
- Providing airspace control and performing airspace management functions in any area that may be assigned by the ACA.

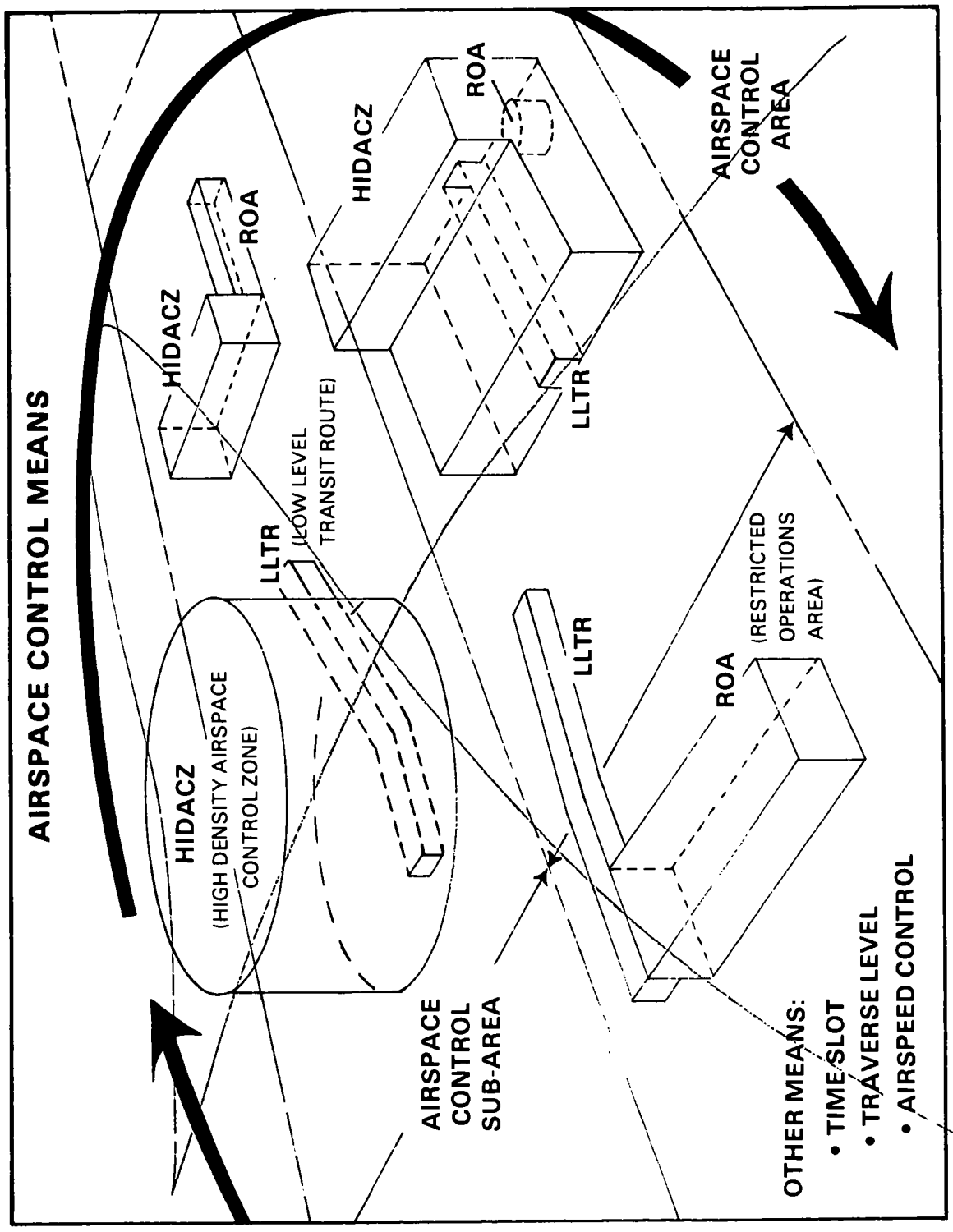


Figure 2-1. Area airspace control plan.

c. ATC commanders are responsible for Army ATC functions within areas of assigned responsibility subject to the policies and procedures established by the ACA and the US Army combat forces commander. These functions include—

- Providing ATC services in accordance with the area airspace control plan.
- Implementing policies and procedures for Army ATC operations.
- Coordinating the operations of their units with Army combat forces and other Service components, as required.
- Integrating Army ATC systems and facilities with airspace control facilities in the theater of operations.
- Employment of ATC units in support of aviation operations.

d. The maneuver commander (normally division, brigade, battalion) is responsible for coordinating the airspace activities within his area of operation. In the vicinity of the front line of own troops (FLOT), the maneuver commander is responsible for the detailed coordination of those airspace users directly participating in his operations. The support provided in response to his requirements must be coordinated in its application, both to maximize effectiveness and to preclude mutual interference. (Although there is *normally* no requirement for a special staff element at the maneuver brigade or battalion dedicated to airspace management, the commander routinely exercises control and coordination through his staff, supporting liaison/fire support representatives, and subordinate unit commanders.) It is envisioned that a single point of contact must be identified as the focal point for this management effort. This is discussed in more detail in chapter 3.

e. Responsibility for compliance with the rules of flight, rules of engagement, and firing restrictions lies with all commanders/leaders and individuals in control of equipment or systems to which such rules or restrictions apply.

f. Procedures for Army airspace management in the combat zone are the same for the divisions and corps; however, the types and densities of airspace-user activities differ between the division area and the corps rear area. The procedures discussed in this chapter are generally applicable at corps and division levels. These procedures are necessary to supplement the joint agreements, procedures, and coordination requirements discussed in FM 100-42. A sample division standing operating procedure (SOP) contained in appendix F serves to illustrate the implementation of these procedures.

2-3. AIRSPACE CONFLICT RESOLUTION

a. Normal operational planning, execution, and adherence to standing operating procedures should prevent most conflicts between airspace users; however, exceptions must be resolved on the spot. The maneuver unit commander must establish priorities for the use of airspace. These serve as the guidelines for resolution of conflicts by the airspace coordinators and users. Initial priorities are published in

SOPs and operation orders with subsequent changes disseminated as necessary. If a conflict cannot be resolved by established priorities, the commander will be advised of the conflict. The commander's decision, which will vary with the mission, enemy capabilities, and support requirements, will then be passed to the elements concerned. When time or circumstances do not permit SOP or command resolution of conflicts, conflict situations presenting immediate safety hazards to friendly forces will be resolved by the coordinator/controller detecting the conflict.

b. A selected representative may be designated and given authority to assign airspace priorities for the commander.

c. The commander or his designated representative will approve use of airspace in support of preplanned operations.

d. Subordinate unit commanders—as well as coordinators, controllers, and operators—will be given authority to make on-the-spot adjustments in airspace operations to preclude unnecessary hazards to friendly forces.

e. Control rules and procedures, delineation of detailed responsibilities, and communication instructions will be provided in SOPs and operation plans and exercised in the field prior to hostilities.

2-4. PROCEDURES

Airspace management and air traffic control must contribute to the overall objective-effective combat employment of the joint force. To this end, procedures are designed to specify airspace management and ATC procedures and to define the means for their accomplishment. Joint control and coordination procedures are discussed in chapter IV, FM 100-42. These procedures include the establishment for use of—

- Agreements.
- Airspace restrictions.
- Identification and recognition requirements.
- Coordination requirements.
- Air traffic regulations.
- Aircraft coordination procedures.
- Indirect fire support coordination.
- Coordinating altitudes.
- Airspace restricted areas.
- High density airspace control zone.
- Low-level transit routes.
- Standard-use Army aircraft routes.
- Terminal control zone.

2-5. AIRSPACE RESTRICTIONS

a. Operational factors may generate requirements for airspace restrictions to be applied to the use of segments of airspace within the area of operations to accommodate specific operational requirements of

component forces. The use of airspace restrictions must be minimized. The restrictions will be evaluated on a case-by-case basis, be temporary in nature, and be limited in time and space.

b. Commanders will inform the region/area ACA of their requirements for airspace restrictions. The request will include the time period during which the airspace restriction will apply. The ACA will coordinate all requests in consideration of the impact of such airspace restrictions on other airspace users. Airspace management liaison sections will continuously monitor the status of airspace restrictions and initiate action to delete them when the need for their establishment is terminated.

c. The following will be precisely defined by the airspace control authority:

- Horizontal and vertical limits of airspace restricted areas.
- Effective times.
- Procedures for movement of aircraft to and from adjoining airspace.
- Procedures for coordination of flight information.
- Dissemination of warnings involving flight safety hazards.

d. When airspace restricted areas or other restrictions have been authorized, the air traffic control/airspace control facility responsible for controlling the air traffic will coordinate instrument flight plans with the airspace management center (AMC) and with adjacent airspace control facilities. This facility will also provide separation of all aircraft in IMC operating within or transiting the restricted operations area.

e. For flight operations conducted in VMC over friendly territory solely within a designated airspace restricted area, the commander for whom the restriction was established will determine when flight plans are required. A determination that flight plans are not required does not relieve the appropriate ATC facility of the requirement to—

- Monitor movements of aircraft within the airspace restricted area.
- Maintain a capability to clear aircraft from the area for air defense purposes.
- Provide information for rescue purposes.

2-6. AIRCRAFT IDENTIFICATION

The air traffic identification requirements for airspace management must be compatible with air defense identification requirements. Identification of friendly aircraft by air defense means promotes—

- Effective airspace control.
- Timely engagement of enemy aircraft.
- Conservation of air defense resources.
- Reduction in risk to friendly forces and facilities.

Monitoring air-movements by electronic methods normally will provide the most rapid and reliable means of identification and will facilitate flexibility of aircraft employment in an area of operations.

Electronic identification should, therefore, be used when available. However, when one or a combination of factors preclude electronic monitoring and identification, visual or procedural means of identification will be used.

2-7. AIRCRAFT COORDINATION

a. To effectively provide airspace management in an area of operations, air traffic control/airspace control facilities must have a capability for—

- Air traffic coordination and control.
- Receipt and dissemination of information involving use of airspace.

b. Coordination is required between facilities of the airspace management system and component command and control element to prevent unnecessary disruption of other activities.

c. The coordination of information pertaining to component services, flight operations, air defense operations, and indirect surface-to-surface fires that may create potential conflicts in the joint use of airspace normally will be accomplished at the lowest level.

d. Both rotary wing and fixed wing aircraft have a requirement to operate in the low and medium altitude structure. Coordinating procedures are required to reduce interference between friendly aircraft operating in areas of intense activity, airspace control facility degradation, or excessive enemy jamming of communications/radar while expediting safe, orderly, and effective combat employment of all aircraft.

e. Remotely piloted vehicles (RPV) may also be employed in an area of operations. Each Service component is responsible for coordinating its RPV activities when they affect other airspace users. Flight data for RPV operations will be provided to appropriate airspace management facilities.

CHAPTER 3

ARMY AIRSPACE MANAGEMENT

3-1. GENERAL

a. Army airspace management incorporates all Army personnel facilities, policies, and procedures involved in airspace management. It must provide for the coordinated use of airspace by combat, combat support, and combat service support units. Also, it must provide for the effective use of airspace in support of the corps and division assigned mission.

b. All Service components have a requirement to operate in the low and medium altitude structures. Close liaison and coordination between all Service components/commanders must be established to insure an unimpeded flow of essential information concerning the use of airspace.

c. The ground commanders (corps, division) require freedom of use of airspace immediately over their forces for maximum flexibility to employ organic aircraft and weapons whenever land forces are committed to combat.

d. The functions listed below are the major components of airspace management in the combat zone that apply to the corps and division levels:

- Coordination of the use/users of airspace.
- Integration of the use/users of airspace.
- Regulation of the users of airspace.
- Identification of the users of airspace.

e. The corps/division air defense artillery (ADA) officer, aviation officer, Air Force liaison officer, fire support coordinator, and combat electronic warfare intelligence (CEWI) officer, along with the air traffic control (ATC) liaison officer, plan the above functions. The commander is responsible for airspace management within his area of operations. The G3 Air serves

as the management focal point for the implementation of the airspace management system.

f. These same functions apply to the brigade and battalion levels. The S3 Air serves as the management focal point for the implementation of the commanders airspace management system.

g. Airspace management rules and procedures are established by airspace control authority (ACA) and issued to all major subordinate units affected. These rules and procedures must allow subordinate units the degree of flexibility required to support their operations.

3-2. AIRSPACE MANAGEMENT FACILITIES

a. Some of the airspace management facilities available are Air Force and some are Army; but they are all there to support the joint effort. Certainly, it is not imperative to be extremely knowledgeable of all these facilities. Brief descriptions of these facilities in appendix B give you additional sources of information not available at operational level. Some of the major Army airspace management facilities and elements employed are described in figure 3-1.

b. The corps and division tactical operations centers are the command installations where necessary personnel and

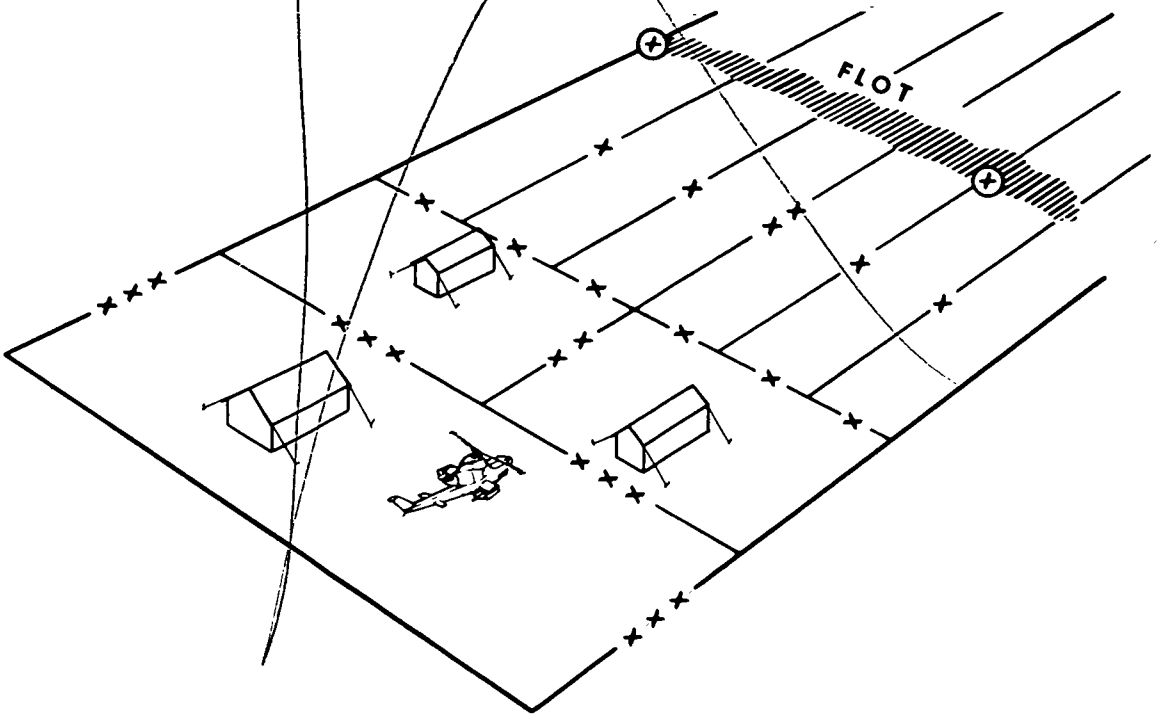


Figure 3-1. Corps and division tactical operations centers.

communication facilities are grouped to accomplish centralized combat and coordination of tactical operations. They are formed from resources of the command as operating elements to accomplish timely staff actions on matters concerning tactical operations. They have no fixed composition, but normally include those elements and personnel considered necessary to perform recurring functions and those elements that assist in coordinating all planned airspace management functions.

c. The corps and division commanders will establish within their tactical operation centers (TOC), an airspace management element (AME) under the staff supervision of the G3. The G3 Air should supervise the actual operations of the AME. Staffing of the AME will include, but not be limited to, the following:

- ADA officer.
- Aviation officer.
- Air Force liaison officer.
- Fire support coordinator.
- ATC liaison officer.
- CEWI officer.

d. At brigade/battalion level no special staff element exists to perform AME functions. Consequently, such functions must be performed by existing staff personnel, supporting liaison/fire support representatives, and subordinate unit commanders on a by-exception basis. Airspace management functions are supervised by the S3 Air; and staffing at this level should conform to division staffing where possible.

e. The AME is a planning and management element with limited information-handling capabilities. The AME determines how the commanders' airspace requirements can best be met. User activities and requirements differ between the division and corps rear area; and in this respect, the functions of the AME will differ accordingly.

f. The AME will—

- Through the correlation of airspace management information, identify and resolve potential conflicts concerning the use of airspace.

  ☐ Develop and maintain the airspace utilization map.

  ☐ Develop, maintain, and disseminate recommended low-level transit routes (LLTR).

  ☐ Maintain and disseminate the information on all restricted operations areas (ROA), standard-use Army air routes, weapons-free zones, preplanned field artillery fires, air-mobile operations, major aviation operations, and forward arming and refueling point (FARP) locations.

- Relay information concerning air defense warnings; rules of engagement (weapons control status, hostile criteria).

- Monitor the status of air defense and aviation assets and advise the commander.

- Maintain and disseminate the status and location of navigational aids (NAVAID) and landing sites.

- Coordinate and disseminate information concerning the establishment of coordinating altitudes and changes thereto.
- Disseminate information concerning enemy air defense activity.
- Coordinate requirements for airfield terminal control zones.
- Provide airspace management information relevant to development of air-movement plans, and insure that airlift requirements are included in airspace utilization annexes.
- Coordinate and disseminate to the ATC and ADA procedures to be used by aviation units for across front line of own troops (FLOT) operations to include return procedures.
- Coordinate selective identification features/identification, friend or foe (SIF/IFF) procedures for Army aircraft to include the location of the SIF/IFF line.
- Disseminate to flight operation centers (FOC), flight coordination centers (FCC), and aviation units any grid matrix systems to be used to facilitate early warning and short-range air defense (SHORAD) control.
- The AME will also provide the following information, as a minimum, to the FOC/FCC:

☐ Low-level transit routes and standard-use Army air routes.

☐ Requirements for navigational aids and terminal facilities.

☐ Restricted areas, weapons-free zones, air defense weapons control status, and rules of engagement.

☐ Coordinating altitude.

☐ Field artillery and ADA fire unit location.

☐ Aviation annex to operation plans and orders.

☐ IFF/SIF codes.

☐ Instructions to broadcast air warnings (e.g., friendly nuclear strikes, close air support strikes, significant artillery concentrations).

3-3. ECHELONS ABOVE CORPS (EAC)/AIR FORCE INTERFACE

Integration of EAC activities with the Air Force is achieved by an Army battle coordination element (BCE) for operations and intelligence located at the tactical air control center (TACC). A TACC will normally be established in each air defense region or air defense area when there are no regions. The BCE advises the USAF on matters such as command and control, electronic warfare (EW), close air support, airlift, airspace management, suppression of enemy air defense (SEAD), and interdiction target coordination. The organization of the BCE (fig 3-2) allows for Army representatives to be located in the combat plans, combat operation fusion divisions, and those intelligence divisions of the combat intelligence center (CIC) in the TACC.

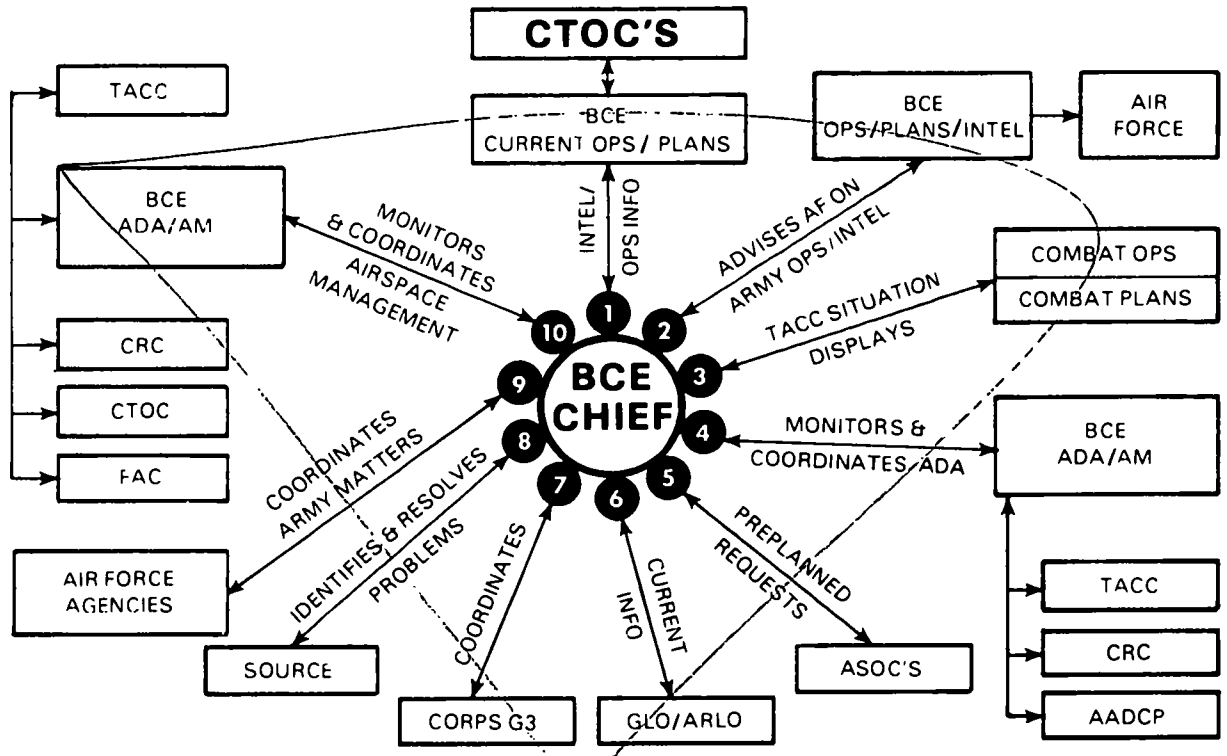


Figure 3-2. The BCE coordinates Army activities with the USAF.

3-4. BATTLE COORDINATION ELEMENT

a. The BCE enhances information exchange and interprets land operations for the benefit of the Air Force component commander. The BCE will be augmented as necessary with personnel from the senior Army headquarters in the region or area when no regions exist. All augmentees become members of the BCE and operate under the supervision of the senior officer of the BCE. Additionally, an ADA liaison team from the senior ADA command within the region or area should normally be located at the TACC. Air defense artillery and Air Force operations are coordinated to prevent mutual interference, to exchange intelligence information, and to insure the safety of friendly aircraft from ADA fires.

3-5. AIRSPACE MANAGEMENT LIAISON SECTION (AMLS)

The process of coordinating corps airspace activities with other Service components involved will be accomplished through the airspace management liaison section. The AMLS personnel act as the corps commander's representatives responsible for the coordination and integration of Army airspace-user requirements with those of other Service components. An AMLS

(normally two aviation officers and two ADA NCOs) from each corps will be provided to the EAC where the coordination, integration, and consolidation of information concerning Army airspace requirements will be accomplished prior to forwarding this information to the BCE at the TACC. In these cases where the corps is the senior Army headquarters, the AMLS serves as an augmentation to the BCE. AMLS personnel will—

a. Provide other Service components with information concerning Army airspace requirements (e.g., restricted areas, coordinating altitudes, airmobile assaults, significant artillery concentrations, air defense weapons-free zones).

b. Inform the appropriate Army element of other Service operations that may affect ground operations.

c. Arrange for standard use Army aircraft routes in the rear operations area. The corps airspace management element (CAME) will determine corps requirements for such routes.

d. Arrange for the integration of Army air traffic control facilities with tactical air control system elements.

e. Provide Army recommended low-level transit routes to the tactical air control and reporting center (CRC).

3-6. ARMY AIR TRAFFIC CONTROL FACILITIES

a. A network of flight operations centers, flight coordination centers, approach/departure control facilities, airfield

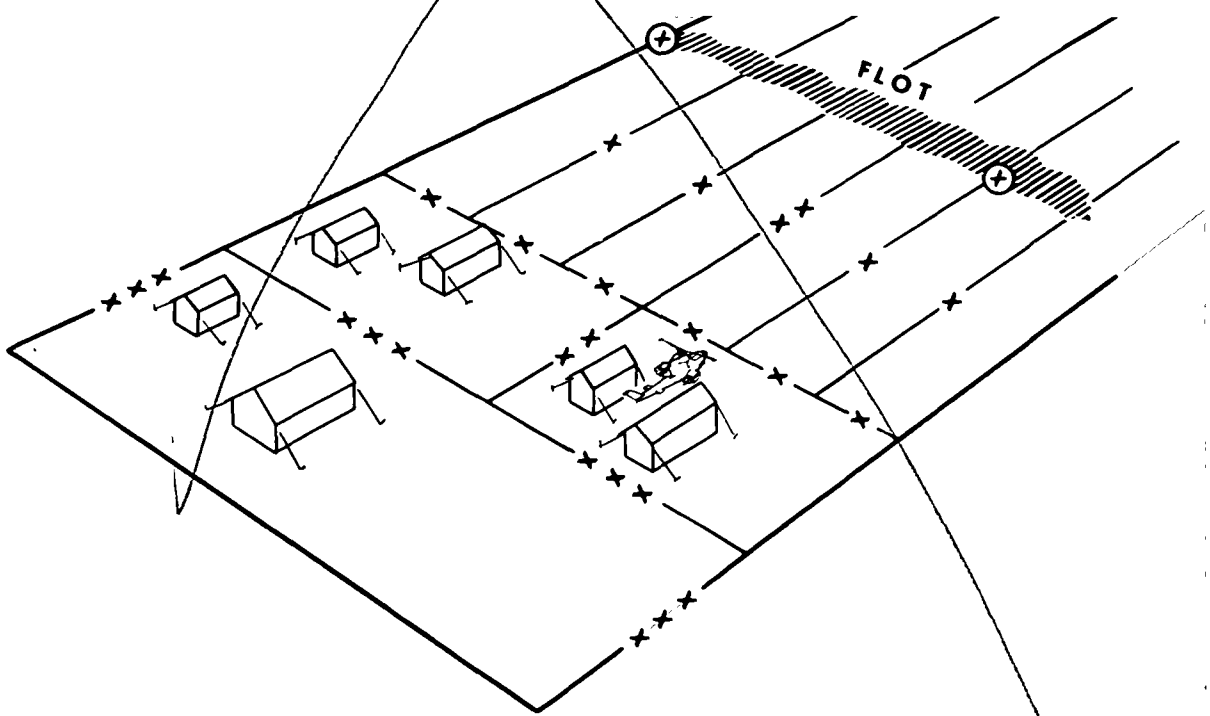


Figure 3-3. Army air traffic control facilities.

control towers, and navigational aids is provided throughout the area of operations for the control and coordination of Army air traffic. The airspace management section of the BCE at the Air Force's tactical air control center and the ATC personnel at the CRC coordinate the integration of Army air traffic control facilities with other service component control facilities. Coordination of Army air traffic with other service component air traffic and integration of Army air traffic into and out of corps and division areas normally are accomplished by these Army ATC facilities. These facilities provide the required Army en route and terminal ATC services.

b. Army ATC facilities will be integrated with Air Force ATC facilities to the degree possible to avoid duplication and to make maximum use of the ATC capabilities of both services. The airspace control authority will prescribe the degree of facility integration based on requirements and equipment availability.

3-7. FLIGHT OPERATIONS CENTER

a. The FOC is collocated with, or electronically connected to, the Air Force CRC. One FOC is deployed in the corps area of operation and serves as the primary interface with the CRC in the control of Army air traffic when this traffic comes under the purview of the FOC (fig 3-4). The Air Force is responsible for providing communications from the FOC to the CRC.

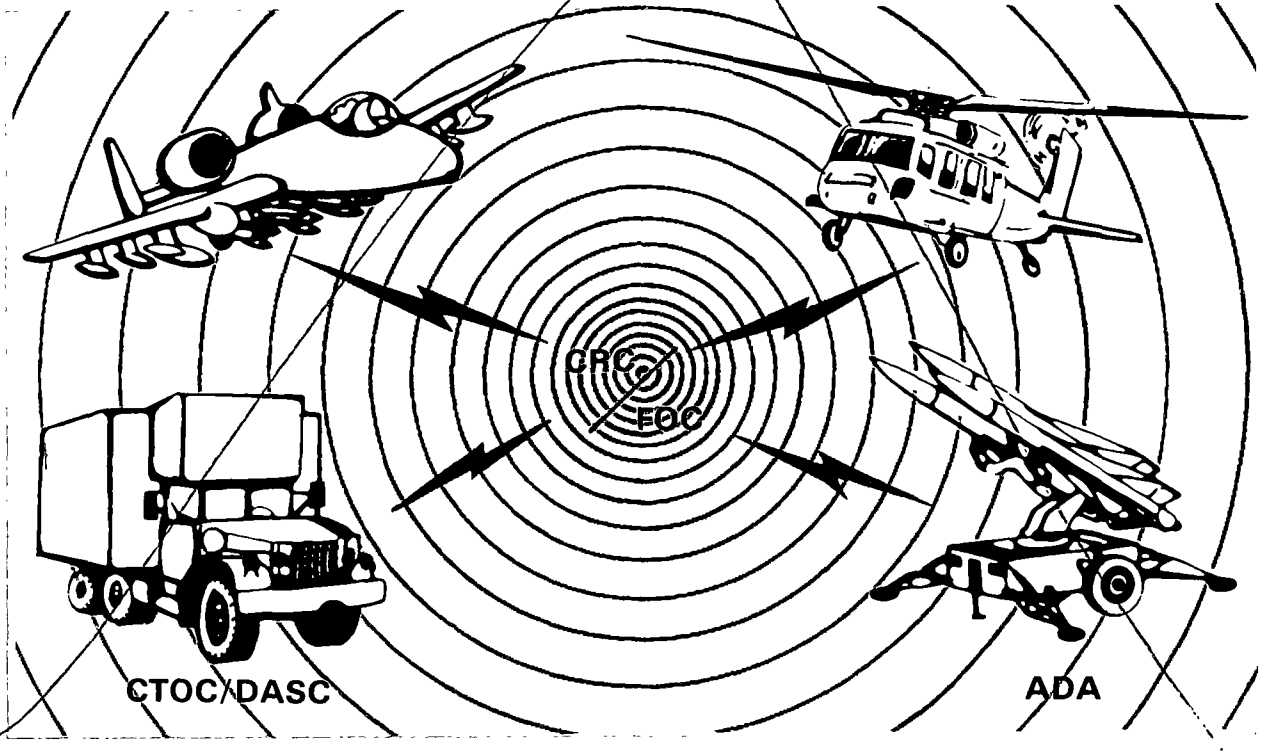


Figure 3-4. FOC interface.

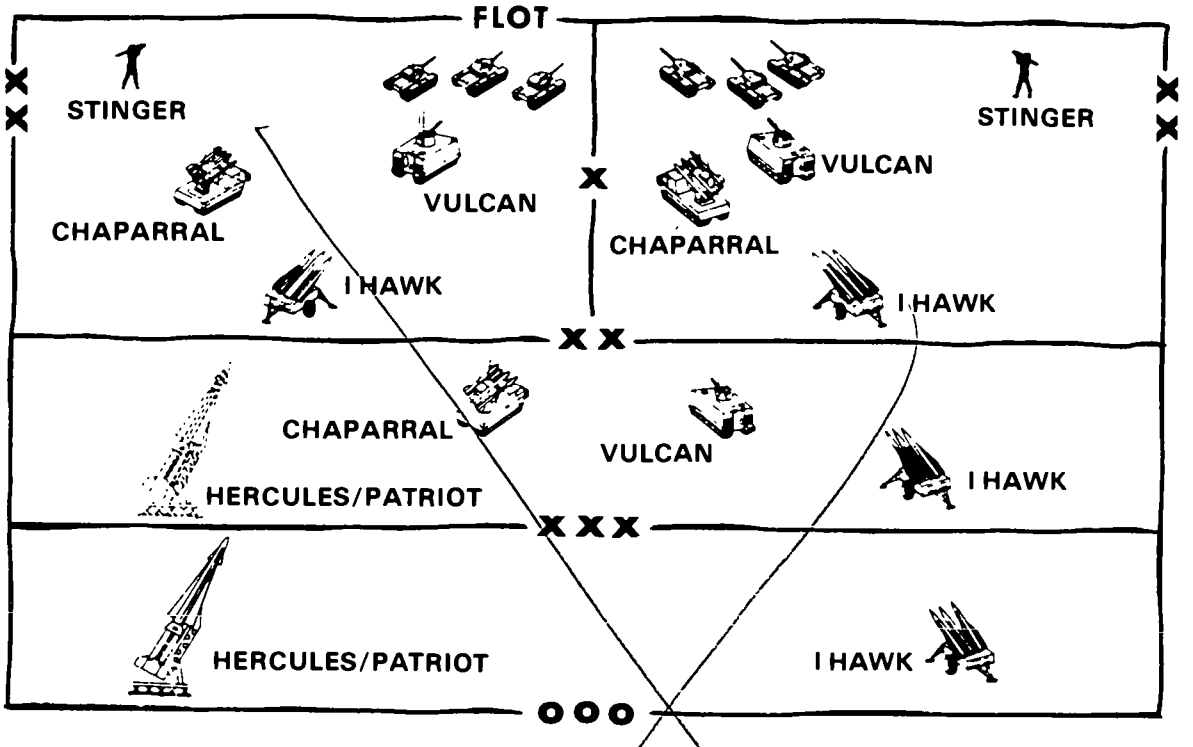


Figure 3-5. Army air defense facilities.

b. Additional information on the organization, deployment, mission, and function of Army ATC facilities is provided in chapter 4.

c. Army air defense fire units (fig 3-5) are controlled from command posts (CP) established at Army air defense brigade and battalion levels. The fire direction centers (FDC) coordinating the fire of Hawk and Hercules fire units are supported by local radars and semiautomatic command and control systems which are tied to the CRC or the control and reporting post (CRP) of the sector. Chaparral/Vulcan FDCs are manual and depend on voice communications and procedural methods for control. FDCs are key air defense control facilities in the corps rear and division areas. They become integral parts of the airspace management system by virtue of their inclusion in the area air defense system.

d. Additional information on the mission, functions, and deployment of Army Air Defense Command Posts (AADCP) may be found in FM 44-1.

e. Air defense artillery fires are controlled by air defense rules and procedures established by the area air defense commander (AADC). These fires are controlled to—

- Insure efficient engagement of hostile aircraft.

- Prevent engagement of friendly aircraft.
- Prevent air defense artillery and aviation mission interference.
- Prevent incidents prior to an outbreak of hostilities.

FM 44-1 contains a discussion of the control of air defense fires. Air defense unit command posts and the force G2/S2 have the basic responsibility for disseminating information regarding hostile aerial activity.

3-8. FIRE SUPPORT

a. Field artillery support plans, firing battery locations, and significant intensities of fire are provided to the division airspace management element (DAME) by the fire support element. Since the intensity, duration, and location of indirect fire support are tied to the tactical situation and are not generally predictable, reports at division level of detailed artillery fires are not timely or usable.

b. At brigade/battalion levels, commander, S3, subordinate unit commanders, fire support coordinator, S3 Air, and tactical air control party coordinate to the extent practicable to preclude airspace conflicts between indirect fires and aircraft operations.

3-9. COMMUNICATIONS

a. Successful functioning of airspace management and air traffic control requires complete, reliable, and compatible communication networks to insure uninterrupted flow of near real-time information. They should include common-user, priority, sole-user, and voice circuits. Maximum use should be made of radar or other electronic means for identification and ATC services. When radar control is not possible or practicable—normally in the tactical operations area—identification and control will be accomplished by procedural methods. Standing operating procedures (SOP) and operation plans and orders prescribe normal communications-electronics support for airspace management and ATC operations. Communication means are integrated into a wide network to provide airspace management for Army and Air Force aircraft, air defense, and indirect fire means. Electronic assets organic to air defense elements may be used to support airspace management and air traffic control operations.

b. Basic communications-electronics doctrine is contained in FM 11-50, FM 11-92, and FM 24-1. Airspace management communication requirements are met by use of the communication means available and, when practicable, by habitual collocation of airspace management and control facilities. Appendix D describes the Army air traffic contrtol, aviation, and air defense radio nets used in the management of airspace at the division level. Air traffic control command and control as well as operational communications requirements are met with organic and area signal systems. Additional information concerning air traffic control communications requirements are outlined in appendix D.

3-10. ELECTRONIC WARFARE

Aircraft navigation systems, air-to-ground missile guidance systems, and communication and noncommunication emitters are lucrative targets for electronic warfare. Airspace management planning must consider the application of electronic countermeasures, such as jamming and deception, to reduce the effectiveness of enemy surveillance and fire control equipment and electronic counter-countermeasures (to include antenna relocation and operating emitters at low power) to degrade enemy electronic warfare activities. (For detailed actions, see FM (C) 32-20.) Resources for EW support measures can be used to provide positive identification and location of enemy emitters and units. Of primary importance to airspace management is the requirement for close coordination between air and ground elements to insure that electronic countermeasure operations—particularly jamming—do not interfere with the Army airspace management system. Each ATC facility will prepare vulnerability graphs in accordance with TB 380-6-6 (S). These graphs assist the commander in his battlefield survivability under EW conditions.

CHAPTER 4

ARMY AIR TRAFFIC CONTROL (ATC)

4-1. GENERAL

a. Army ATC is a service provided within the communications zone (COMMZ) or the combat zone to contribute to the maximization of combat effectiveness by promoting the safe, efficient, and flexible use of controlled airspace. In this context, ATC is one of the four tasks of airspace management. The four basic and indivisible tasks of airspace management are shown in figure 4-1.

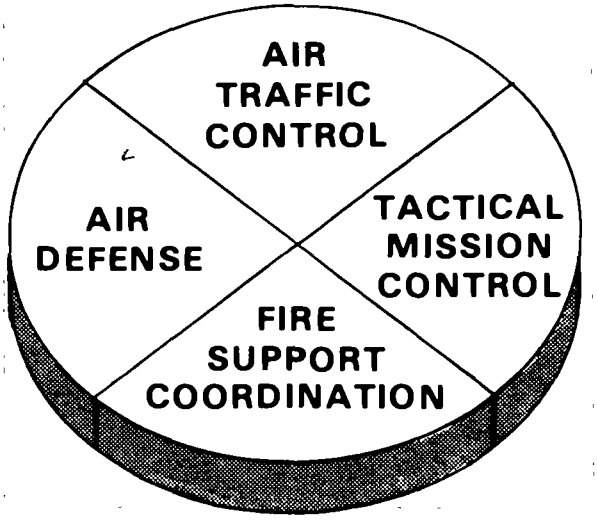


Figure 4-1.
Airspace management—the whole pie.

b. Army ATC may be either positive, procedural, or a combination of both, depending on tactical needs and/or system capabilities.

4-2. RESPONSIBILITIES

Army air traffic control unit commands are responsible for providing ATC services and coordinating ATC functions in their assigned area of operations. These responsibilities are also defined in chapter 2.

4-3. ORGANIZATION

Army ATC units in a theater of operations are organized under an ATC group headquarters. The ATC group and its subordinate battalions are not structured units (i.e., structured with composite battalions with lettered companies). They are task-organized in order to provide a flexible means by which they can be force structured to support various-sized US Army combat forces in a theater of operations or when these forces are deployed as a separate task force.

4-4. ATC GROUP ORGANIZATION AND DEPLOYMENT

a. Army ATC units which are the building blocks used to organize an ATC group are as follows:

- TOE 1-222H, Headquarters and Headquarters Detachment, ATC Group.
- TOE 1-223H, Air Traffic Control Company (COMMZ).
- TOE 1-226H, Headquarters and Headquarters Detachment, ATC Battalion (Corps).
- TOE 1-227H, Air Traffic Control Company (Forward).

b. When a US corps headquarters and its aviation assets are deployed between the Continental United States (CONUS) and overseas theater of operation, the ATC platoon, which supports corps aviation operations, will deploy with it. When a US division and its aviation assets are transferred between CONUS and overseas theater or is cross assigned or attached between corps or task forces, the ATC platoon supporting that division normally deploys with it. In both of the above cases, the ATC unit redeployed will be reassigned or attached to the appropriate headquarters of the ATC unit in the new area of operations.

c. A typical scheme for operational deployment of these units is shown in figure 4-2.

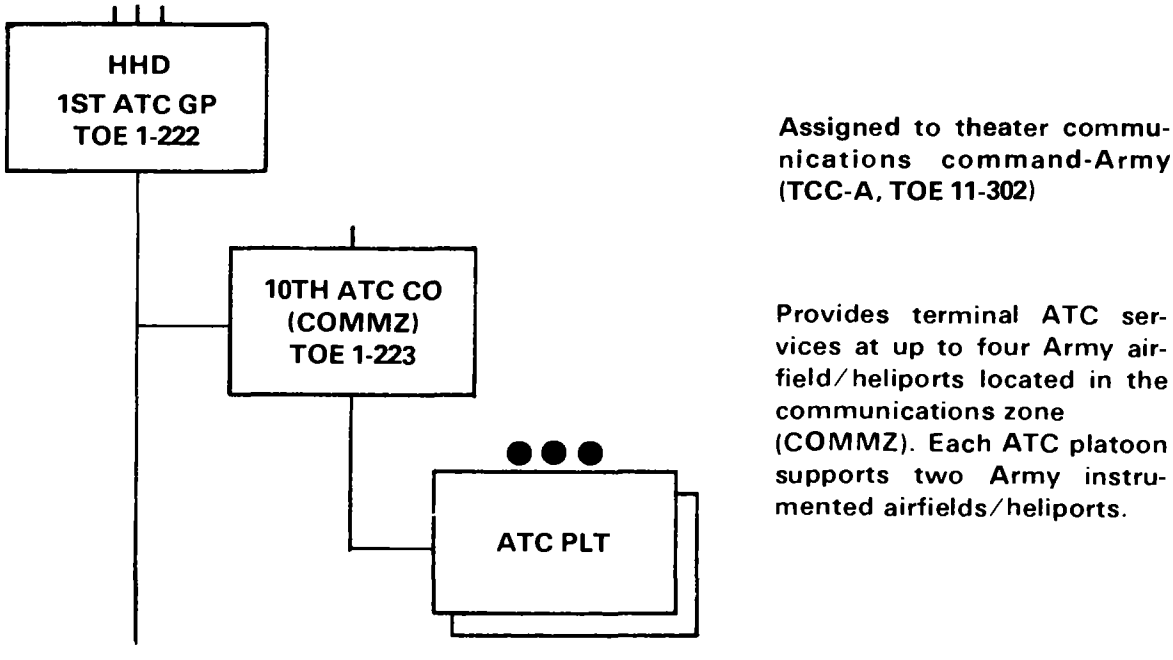
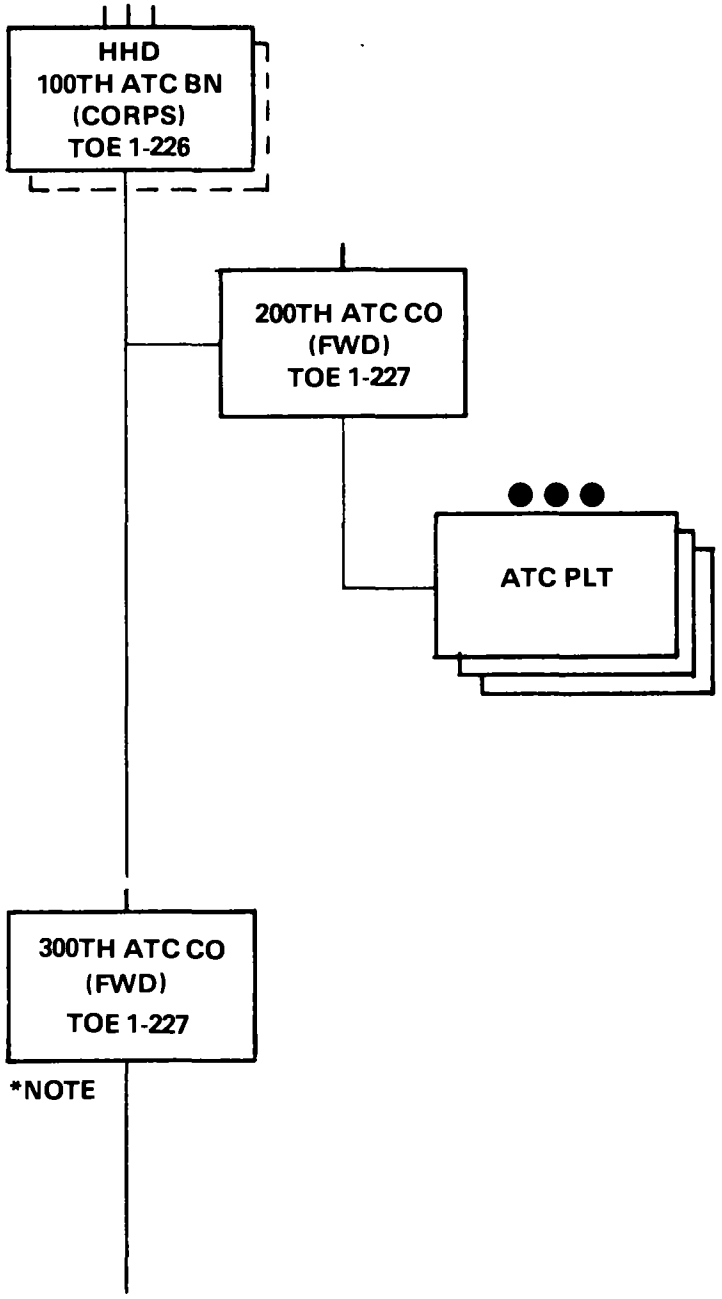


Figure 4-2. Typical scheme for operational deployment.

COMMZ

XXX

CORPS



Assigned to ATC group, one ATC battalion is placed in direct support of each US corps in the theater of operations or a separate task force.

Normally, two ATC companies (forward) are assigned to an ATC battalion. One ATC company is located in the corps rear area. It is normally organized with three ATC platoons. Each ATC platoon supports one corps instrumented airfield/heliport. The three platoons also provide ATC en route services in the corps rear area.

The other ATC company is organized with sufficient ATC platoons to deploy one ATC platoon to support each of the divisions assigned to the corps. Due to the command and control limitations, normally no more than five ATC platoons will be assigned to this ATC company.

**NOTE:* Additional ATC company headquarters and platoons are assigned or attached to the ATC battalion when more than five divisions are assigned to a corps. Missions and functions of ATC units are contained in appendix C.

Figure 4-2. Continued.

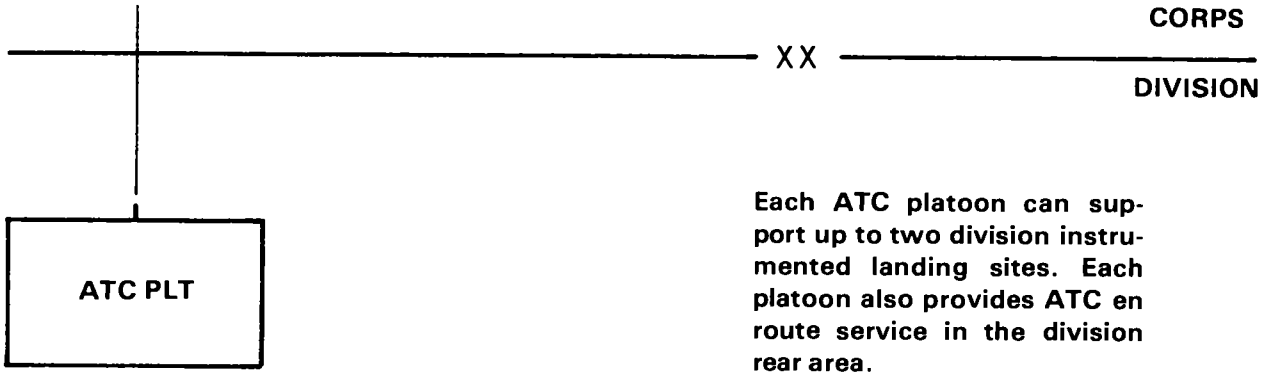


Figure 4-2. Continued.

4-5. PATHFINDERS

Army pathfinder elements provide navigational assistance and aircraft control/advisory services, as necessary, during any phase of an operation that requires sustained employment of Army aircraft. Pathfinder personnel are normally used to select, improve, mark, and control landing/pickup/drop zones. They may also operate at forward helipads. The pathfinder facility maintains communications with aircraft and fire support units, as necessary, for control and coordination in the landing/pickup/drop zone area. Unit terminal guidance personnel may perform similar functions. Pathfinder elements are organic to corps and division aviation unit table(s) of organization and equipment (TOE).

CHAPTER

5

CONCEPT OF OPERATIONS

5-1. GENERAL

Aircraft movements within an area of operation may be conducted under visual flight or in an environment requiring instrument flight, depending on—

- The mission requirements.
- The weather and visibility situation.
- The facilities available.

Instrument flight forward of the brigade rear boundary will be the exception, rather than the rule. Combat missions normally will not be conducted under instrument meteorological conditions (IMC). Enemy threat considerations dictate the altitude levels at which Army aircraft will operate.

5-2. ENEMY THREAT

In the forward areas, enemy surveillance radar and air defense weapons capabilities will require Army aircraft to use terrain flying techniques. Aviators must take advantage of concealment afforded by terrain, vegetation, and man-made features. In rear areas, aircraft operations may be conducted at higher flight levels, depending on the threat. However, whether in a forward or rear area, aviators must always take advantage of available terrain masking for cover and concealment to prevent observation or detection of the aircraft and its point of departure and landing.

5-3. THREAT PROFILE

a. Figure 5-1 shows an example of how the air defense threat will appear on the modern battlefield. The illustration graphically shows the relationship of tactical flight in rear areas to tactical flight in the forward areas. As the aviator flies toward the front line of own troops (FLOT), he must lower the flight altitude to remain below the air defense threat. He may be able to use standard instrument rules and procedures, if necessary, in rear areas. In the rear areas, the *effective range of enemy air defense missile* and other weapons do not pose as large a threat.

b. The aviator must constantly be alert to the threat of possible communications jamming and monitoring throughout the

battle area. Nearer the FLOT, he will be within the range of the enemy *early warning* and *tracking radar.* It is important for the aviator to be aware that he can be within this radar range even though he is still outside the effective range of the enemy air defense missiles and other weapons. Although he may be beyond the range of ground-based weapons, he may be engaged by enemy aircraft. The aviator may still be able to fly at higher altitudes or use standard instrument flight procedures in this area, but should be transitioning to the lower flight altitudes associated with terrain flight and tactical instrument flight.

c. As the aviator continues to move toward the FLOT, he will come within the *effective range of the air defense weapons.* At this point, he must always remain low enough to avoid acquisition by the *early warning and tracking radar.* In doing so, he must reduce the flight altitude to a level below the enemy threat, yet high enough to provide a safe clearance of terrain obstacles. Naturally, as the aviator flies toward the FLOT, the capability of enemy radar to acquire and track him will continue to increase. The aviator must continue to adjust his altitude and flight route accordingly to remain below this threat or to be masked by the terrain.

d. In the area forward of the division rear boundary, it is highly unlikely that standard instrument rules and procedures will prevail. Consequently, different techniques will be necessary to operate under IMC. To enhance the all-weather capability of Army aviation, the concept of tactical

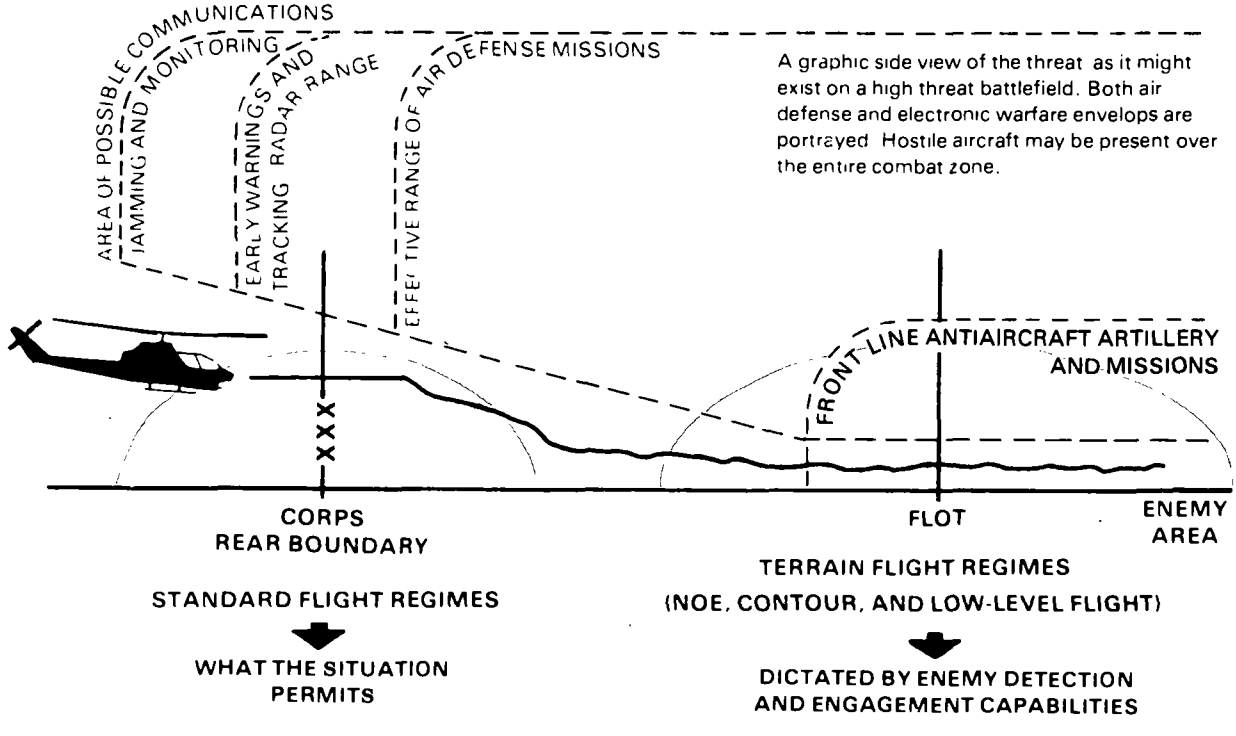


Figure 5-1. Air defense threat profile.

instrument flight is proposed as an option to operating when the mission is essential and weather conditions are not sufficient to allow visual flight.

e. Tactical instrument flight is defined as *flight under IMC in an area directly affected by the Threat.* It is used as a means to complete assigned missions when ceiling or visibility conditions preclude visual flight. Tactical instrument flight operations and procedures are discussed in detail in FM 1-5.

f. Air traffic control (ATC) personnel, as well as aircrews, must be integrated into tactical instrument flight training. Units must incorporate tactical instrument functions into their everyday missions. Training practices that can be used on a routine basis are—

- Flying at lower altitudes.
- Minimal dependence on available navigation and communications equipment.
- Detailed premission planning.
- Postmission debriefing.

g. The point is that "tactical instrument flight is an option." Its use will depend on the air defense artillery (ADA) threat and mission requirements. In the final analysis, the option selected may be a combination of all methods.

5-4. ARMY AIR TRAFFIC OPERATIONS

a. The procedures employed in performing air traffic identification and control functions will vary from the surveillance and advisory—only aspects of a monitoring service to one of positive air traffic separation provided under the concept of positive control. Recognizing that positive control of all traffic in an area of operations is not possible, the objective of the airspace control system is to provide (as a minimum) flight-following service to all flights conducted in instrument conditions and to those flights conducted in visual flight conditions that will cross an airspace control boundary either inbound or outbound. Flight-following is a service provided by an ATC facility in which the en route progress and/or flight termination of an aircraft is determined by use of aircraft position reporting procedures. The service includes relaying to aircraft, when requested, information affecting a flight such as weather conditions and warnings to aircraft. An airspace control boundary defines the lateral limits of an airspace control area, airspace control sector, airspace restriction, or high density airspace control zone. (See FM 100-42 for additional information about a high density airspace control zone.) The airspace control authority (ACA) will establish the criteria by which aircraft will operate under instrument or visual flight rules, depending on mission requirements and system capability. Division assigned/attached aircraft operating under visual meteorological conditions (VMC) within the division area *normally will not be required to file flight plans.* When air operations are conducted in VMC, responsibility for air traffic separation is vested in the aircrews. Monitoring service and/or navigational assistance should be obtained from an appropriate ATC facility, when available.

(1) All air traffic operating in the corps and division under IMC will be

provided ATC service and, to the maximum extent feasible, positive radar control. Positive separation of traffic is dependent on knowledge in the airspace management center of all movement operating under like conditions; therefore, *authority for all instrument flights will be issued by the airspace control authority.* Coordinated tactical clearance procedures (fragmentary orders, etc.) normally will be used, and separation of aircraft will be effected through ATC facilities.

(2) When IMC prevails and tactical operations of an emergency nature must be conducted on an immediate basis, the ATC capabilities of terminal radar facilities may be used, when available, to provide traffic separation until such time as control may be coordinated with and assumed by another airspace control facility. The airspace control authority will be notified of such operations by the most expeditious means available.

(3) Helicopters are exempt from filing flight plans when flying fragmentary operation order missions, scrambled for an immediate support mission, or when assigned an emergency support mission. In these cases, the following clearance procedures apply:

- A fragmentary order is considered a flight plan, and clearance will be provided.
- The authority ordering a scramble will notify the appropriate ATC element.
- If a mission is ordered from a location where an ATC facility is not available, the pilot will contact an appropriate ATC facility as soon as practical after becoming airborne.

(4) Army ATC facilities provide continuous ATC service in the rear operations area. They also provide emergency and routine weather and air-warning information to aircraft in flight. The Air Force airspace management liaison section (AMLS) at the control and reporting center (CRC) coordinates the integration of Army ATC facilities with other Service component ATC facilities. Integration of Army air traffic into and out of the division areas is accomplished through the appropriate Army ATC facility. Thus, these facilities provide the interface for integrating and controlling Army air traffic in the rear operations area.

(5) The Army ATC company (forward) will establish a flight operations center (FOC) and one or more flight coordination centers (FCC) in the rear operations area for the control of Army aircraft. FCCs organic to the Army ATC company (forward) are established to extend the communication capabilities of the FOC. They normally serve as communication links between the FOC and the ATC terminal facilities at Army landing sites. The FOC and FCCs are located, as necessary, to provide coverage for aircraft operating in the rear operations area. Aircraft moving between the rear operations area and the tactical operations area will be handed over to or received from FCCs providing support to the tactical operations area. The FOC is collocated with—or electronically connected to—the Air Force control and reporting center. An FCC may resume the role of the FOC if the FOC is rendered inoperative or is displacing.

(6) In addition to FCCs in the rear operations area, there normally will be at

least one FCC designated to provide ATC service support for each division. The FCC serves as the primary ATC facility for Army air traffic control in the tactical operations area. It is usually located to permit optimum air-ground communications and to provide a radio communications link between the terminal facilities of the division airfields, other airfields located nearby, the division tactical operations center, and the FOC. The FCC will establish liaison with the ADA tactical operations center (TOC). The ADA unit's radars, with real-time input from the associated fire units, can provide increased low altitude radar coverage over the division and forward of the FLOT to the FCC by voice and data links through the ADA TOC. FCC liaison with the ADA TOC provides a link between Army air defense, Army aviation, and Air Force systems. However, the air defense mission will remain the first priority for the ADA unit should a conflict occur. The ADA TOC/FCC will provide certain airspace management service to aircraft operating in and forward of the division area on an as-required or emergency basis. The following are options that may be selected in siting the division FCC in relation to the ADA TOC in order to maximize service to aircraft:

- Collocate the FCC with the ADA TOC.
- Electronically connect the FCC with the ADA TOC.
- The FCC may interface with either a divisional or nondivisional ADA unit.

(7) The division FCC is responsible for providing ATC service for Army aircraft within the division area and serves as a point of access into the airspace management system.

b. Employment of Army aviation in the brigade area may require terrain flying techniques under control of the brigade. Aviation unit operations will provide advanced entry information briefings to include the supported unit's tactical situation to crews entering the brigade area. The supported unit (brigade/battalion) must be provided advanced information on arrival time and place of entry of Army and other Service supporting aircraft entering the respective area to provide support. Army aircraft operating in the brigade and battalion areas are routinely controlled through the chain of command. The degree of control necessary to prevent interference will depend largely on the intensity of combat activity. Commanders communicate directly with Army aviators to accomplish tasking and to coordinate tactics and techniques.

c. The following descriptions are examples of airspace management and ATC operations of units in a typical defense posture as depicted in figure 5-2. They are not intended to be "school solutions," but are intended to bring together systems described in earlier chapters.

d. Consider yourself with an assault support helicopter company participating in a resupply mission to a unit located in the cover force area (CFA). We really need not be specific about the unit mission because the point here is to describe how the air traffic management system contributes to the mission accomplishment. Since Army aviation pays the highest dividends when tactical operations are fast-moving or

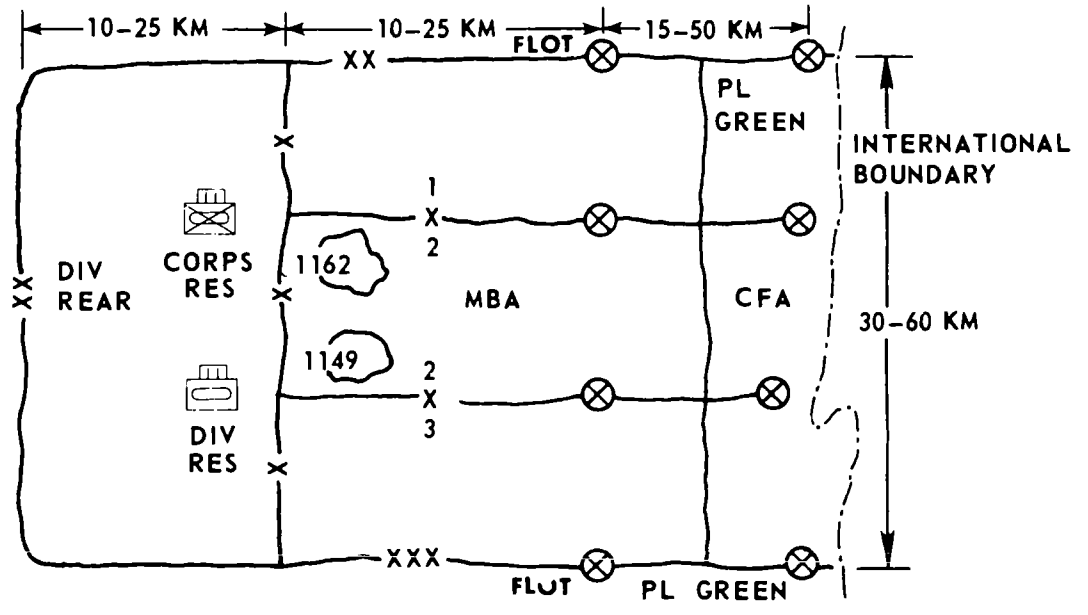


Figure 5-2. Typical defense posture.

changing, we want an ATC system that allows them to be just that—*fast-moving and responsive.* The system we shall depict is one that follows these basic principles.

- Minimize controls and restrictions.
- Issue requested in-flight advisories.
- Minimize communications and reporting requirements.

e. Now for a question always asked: "What about the aircraft belonging to other units in the CFA, and will there be controls insuring separation, location, identification, etc.?" The only Army aircraft working the airspace in the CFA will belong to the covering force or be operational controlled (OPCON) to it. Remember, the airspace manager up there is the maneuver commander—the covering force commander.

(1) He knows *who's supposed to be out there, where they are,* and *what they're doing.* His staff has taken particular care to make sure air and land briefings include all those items necessary to preclude any problems.

(2) "OK, that sounds fairly realistic, but what about the Air Force?" Through mission briefings, the Air Force is kept abreast of the covering force mission. Additionally, information is passed back through any one of the various agencies described in appendix B. Further, the airspace control authority has established a coordinating altitude.

f. Coordinating altitudes designated by the ACA are to reduce conflict between rotary wing and fixed wing aircraft. Therefore, this measure should help eliminate the possibility of surprise meetings. However, "see-and-be-seen" during VMC will be the prevailing aid in avoiding conflict.

(1) "So far so good, but are we going to need to talk to each other and give position reports? Is someone going to make us report checkpoints A, B, C, . . .?"

(2) First of all, radio traffic is going to have to be kept to an *absolute minimum.* To keep from giving away your location and what your mission is, the commander is most likely to have only a checkout and a check-in procedure. After that, it will be intraflight communication only. That, too, should be reduced because casual chatter on the radio between aircraft could give the Threat a good fix on your flight.

(3) As far as communication between other flights is concerned—that too is doubtful. It would be nice to know their status, but nap-of-the-earth (NOE) flight may negate the line-of-sight necessary for radio communication.

(4) Conducting operations in this area is going to be a situation of "seeing and being seen" to prevent meshing rotor blades with an aircraft on another mission.

g. We could complicate this assault support helicopter unit's mission by adding a little weather, instrument meteorological conditions (IMC). What do we do now? Is this where the controls are going to appear? Well, if the mission briefing covered weather—and we expect it did—you should know what to expect and plan accordingly. However, inadvertent IMC is always a possibility—so what then? Inadvertent IMC procedures followed by tactical instrument flight perhaps?

h. Airspace management procedures in the main battle area (MBA) should not differ too dramatically from the CFA. Traffic will increase; but generally, it will be free-flowing and follow the parameters shown in figure 5-3.

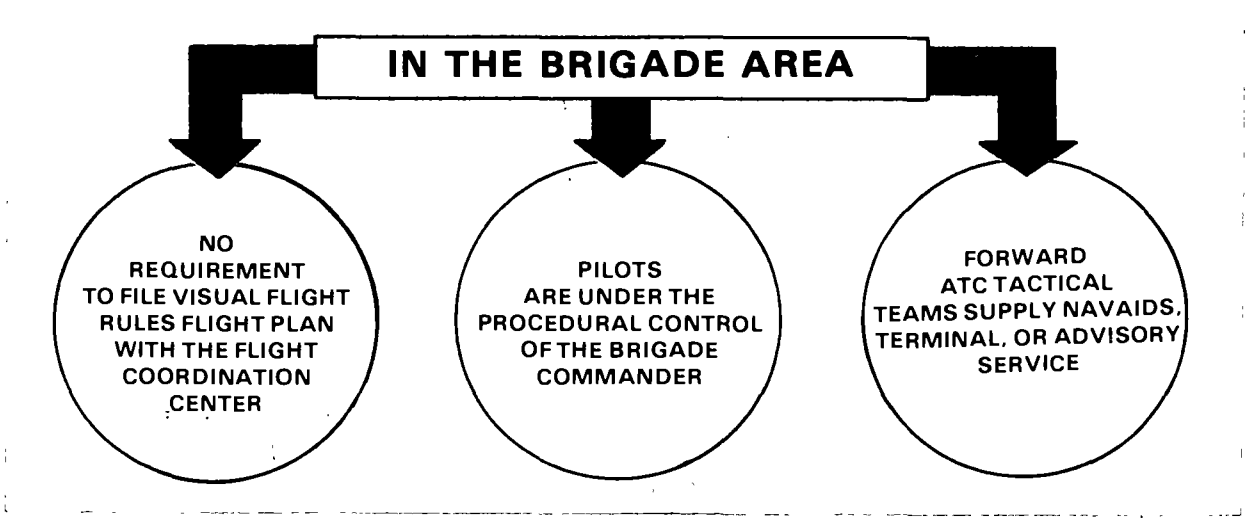


Figure 5-3. Airspace management parameters.

i. So what do we do now? We have the brigade commander of the maneuver units serving as the airspace manager. He will insure his airspace management personnel conform to the following guidelines:

- Don't overcontrol.
- Obtain and disseminate coordinating altitude information.
- Establish flight routes.
- Broadcast requested advisories—not routine.
- Additionally, he will charge his pilots with the mission of "see-and-be-seen," and they will keep his airspace management personnel and supported units advised of any in-flight changes that would affect the mission or interfere with other missions.
- Finally, he will impress upon his subordinate maneuver commanders and their staffs the importance of comprehensive pilot briefings.

j. The concept of effective airspace management at the maneuver unit level is dependent on procedures that will work in a degraded command/control communications environment. The key has to be a coordinated effort of maneuver commanders, airspace management personnel, and pilots. Adherence to standing operating procedure (SOP) and realistic training will provide a smooth working organization.

k. What about instrument (IMC) flight? Actually, the situation will improve slightly as we move away from the line-of-contact (LC). The threat will still be there, but perhaps not as intense as in the CFA. The options remain roughly the same under IMC in the MBA as existed in the CFA. Tactical instrument flight is the answer for aircraft operating under adverse weather conditions when the tactical situation requires the mission to be flown.

l. Planned instrument flights improve considerably the farther back you fly. This is not to say planned instrument flights from the CFA could not be accomplished. That couldn't be farther from the truth. However, the probability of such a planned flight increases the farther we fly to the rear area.

m. Consider an assault helicopter leaving the brigade area and returning to the division landing site for any number of reasons. IMC prevails at its location. The pilot may file a composite visual flight rule/instrument flight rule (VFR/IFR) flight plan by land-line communications prior to departure, or conditions may require him to file an instrument flight clearance while airborne. The pilot receives his clearance from the FCC in the division rear and proceeds via his clearance route. As the aircraft proceeds to the rear, the FCC may assign a higher flight altitude as threat conditions permit, thus increasing the safety margin for obstacle clearance. At an appropriate transition point, the FCC will hand the assault helicopter over to the division landing site ground controlled approach (GCA) team, which is part of the ATC platoon supporting the division airfield; and the pilot will initiate a GCA. Simple enough? We like to think so.

n. In the division rear area, VMC flights continue under the basic guidelines and principles covered in the CFA and MBA. *Again, it is coordination and*

training that are going to make the difference. Even though the division rear is going to have more air traffic, it need not be a complicated myriad of procedures. The type ATC visualized in the division rear is described below.

(1) Under instrument conditions—either planned or inadvertent—the services *readily* available increase significantly.

(2) The ATC company (forward) will have one of its ATC platoons supporting the division airfield. This platoon may be laid out in a configuration as shown in figure 5-4. Location of elements is dependent on the threat. As a matter of sound ATC, the elements will be tied in to the organic tactical teams also shown.

(3) To show the transition to corps, let us extend the flight of the assault helicopter going to the division airfield. Instead of stopping at the division airfield, it proceeds past the division rear boundary heading for one of the corps airfields. At an appropriate transition point, the FCC in the division area will hand the assault helicopter over to the FCC in the corps rear area, will monitor its progress, and continue to provide services for the flight to its final destination. It will then be handed over to the appropriate terminal approach control for approach clearance.

(4) Army air traffic in the corps rear area is serviced by FCCs organic to an ATC unit. These facilities are in direct communication with the FOC which is collocated with the USAF CRC. When the FOC is physically separated from the CRC, the USAF will furnish communication for connecting the two facilities. The FOC will serve as the primary agency for en route control of Army air traffic and monitor the corps/division en route system.

(5) Each FCC receives en route air traffic from, or hands over traffic to, adjacent FOCs and FCCs. The FCC issues weather reports on the basis of information provided by the corps weather teams. Constant communication must be maintained between the FCC and the ADA TOC for coordination purposes. Although collocation of these facilities will assist in

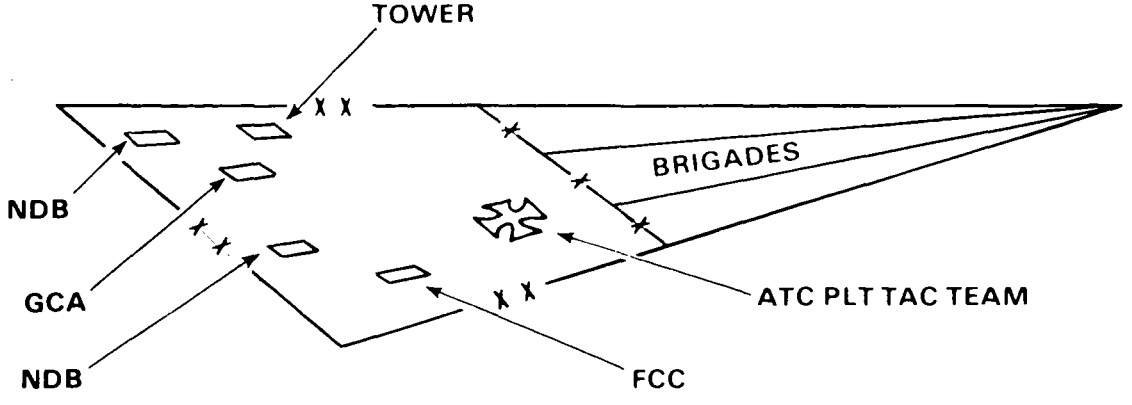


Figure 5-4. ATC platoon.

communications, it also provides a lucrative target for enemy attack—a fact that should always be considered.

(6) FCCs extend the communications of the FOC. An FCC will assume the role of the FOC if the FOC is rendered inoperative or is being moved. An FCC in the corps area routinely will be assigned as the alternate FOC.

(7) FCCs, whether operating in the corps area or in the division area, perform essentially the same function, only at different echelons, and they are provided with the same equipment.

o. It would be nice to say that flight in the corps rear would be as unrestricted as it is in the CFA or MBA. Remember, the airspace does not belong to one service, so we must abide by stated procedures. But are these procedures all that tough to comply with under VMC? No! Will flights at terrain flight altitudes be permitted? Sure they will. All that's asked is to stay in contact with our own FOC and FCCs. What could be simpler? They will provide the necessary guidance and services to get us on our way, out of other traffic's way, and to conform with established procedures. From time to time—still keeping "the Threat" in mind—you may have to come up to altitude to maintain communications, but that's not complicated. Additionally, you still have that coordinating altitude which allows you to climb somewhat without running into another aircraft.

p. Instrument flight in the corps rear area may become similar to stateside instrument procedures; however, these procedures will not be any more difficult to adjust than those imposed by the Federal Aviation Administration (FAA) in the United States.

(1) To illustrate this concept, a flight is described below. The altitude in this description is used purely for sake of illustration. *Current threat information should be consulted before any actual safe altitudes are established.*

(2) The following represents the progression of a helicopter flight from the corps support command (COSCOM) to a field location of a forward brigade.

(3) After a flight plan is filed and an ATC flight clearance is received, the helicopter takes off, and communications are initiated with the FCC. Aircraft location and identification may be confirmed by radar or identification, friend or foe (IFF) interrogator. The helicopter proceeds via the clearance route, using nondirectional beacons and other navigational aids (NAVAID), and is monitored by radar. Although the clearance altitude will be provided to the pilot in mean sea level (MSL), obstacle clearance above ground level (AGL) is a primary concern to the aviator. By preplanning flight routes early, the interpolation of MSL flight information to AGL use is easily accomplished. As the helicopter approaches the division rear boundary, a predetermined transition point may be established at which the helicopter may be transitioned down to a lower altitude. Then it may be handed over to the FCC in the division area for further routing to the approach control facility serving the division main heliport or other intended destination.

(4) The air traffic controller may assist the helicopter to execute a tactical

instrument approach at his destination. Or, if weather and terrain conditions permit, he may provide a GCA-monitored descent to visual flight conditions. This allows the helicopter to proceed visually into the forward brigade area using terrain flying techniques. The radar-monitored descent may be flown away from the FLOT as a deceptive measure, so as not to indicate the flight's destination point to the enemy. Additionally, this procedure will eliminate unnecessary telltale approaches to the division main area, and it will lessen the enemy's ability to fix it or to determine the helicopter's true destination.

(5) Since forward area units normally will displace and relocate navigation and letdown facilities frequently, aviators not intimately familiar with the local situation will often find it necessary to land at a facility in the division rear area to obtain information on the tactical situation, the threat, and flight routes into the forward brigade area.

q. In summary—

- The degree of ATC in the tactical operations area (division/brigade area) is determined by the commanders and based upon the tactical situation.

- Army aviation operations in the tactical operations area normally are conducted in a procedural control environment.

- Army ATC facilities can provide flight-following service NAVAIDS, precision approach radar, advisory, and terminal service.

- The corps FOC is the primary interface with the USAF system on matters concerning the coordination of Army aviation activities.

- FCCs extend the range for the FOC and perform ATC en route services in their area of operational responsibility.

- The FCC coordinates emergency radar service for any aircraft in the division area with air defense and USAF.

CHAPTER

6

STABILITY OPERATIONS

6-1. ARMY AIR TRAFFIC SUPPORT REQUIREMENTS

Army air traffic activities in a stability operation are directly dependent upon the extent to which Army forces, particularly Army aviation forces, are committed to each operation. Although only the minimum air traffic elements required for mission accomplishment should be used, they must be sufficient to provide continuous support during the frequent displacements that are necessary in stability operations. Also, in determining Army air traffic management requirements, consideration should be given to the physical configuration of the theater of operations which can differ more greatly from, and cause a greater requirement for, facilities than that encountered in more conventional operations.

6-2. ALLIED FORCE OPERATIONS

Where US Forces operate as part of a combined force containing military elements of Allied Nations, the joint force commander will establish the basis for allocation of airspace authority to elements of the combined force. For those areas in which airspace management is conducted by participating Army forces, air traffic services will be provided by Army elements as discussed in chapters 3 and 5.

6-3. HOST COUNTRY CONSIDERATIONS

a. **General.** When US Forces are participants in military operations conducted in a host country, policies for the use of airspace by US Forces normally are developed through agreements between the

US Joint Force Commander and representatives of the host country government. These agreements may specify that all airspace over the host country will remain under control of the host country government, with operational control of certain airspace being delegated to the authority of the US Joint Force Commander. The host country may delegate other airspace areas to the authority of host country civil and military organizations, together with responsibility for providing air traffic services for their areas. Thus, since several different organizations may become involved in air traffic activities, it is necessary that the facility established in each area be compatible with each of the other air traffic facilities operating in the host country.

b. **Host Country Aviation.** Host country civil and military aircraft flights in areas not delegated to US or other authority are conducted in accordance with air traffic procedures established by the host country organization concerned. Flights by these aircraft into airspace delegated to US military authority are regulated by air traffic procedures established for each area by the Service concerned in accordance with guidance from the joint force commander through the airspace control authority (ACA).

c. **Security.** Military aircraft operations habitually are oriented toward the use of security measures such as the controlled use of radios and lights. Civil aviation operations may be less oriented toward the use of such security measures. This could result in acquisition by the enemy of information for use in countering civil aviation operations, or for use against military installations and operations in the same or nearby areas. Adequate procedures must be established to insure that all military and civilian aircraft operating in the airspace that has been delegated to the responsibility of the joint force or component force commander will comply with existing security measures.

6-4. ARMY AIR TRAFFIC CONSIDERATIONS

a. Army air traffic control (ATC) procedures used in stability operations are those procedures established for conventional tactical operations, adjusted to meet the requirement of the environment in which the operations are being conducted. Regardless of the adjustments necessitated by the tactical environments, the Army air traffic management system will be based upon the general principles established in preceding chapters of this manual.

b. Since the procedures used by the flight operations center (FOC) and flight coordination center (FCC) in controlling aircraft traffic generally are the same as those used in more conventional operations, facilities of existing Army ATC units usually are adequate to establish and operate a system for stability operations. Facilities of the ATC unit may establish airways for use by air traffic between tactical areas of responsibility. These airways will be controlled by ATC facilities (FOC/FCC) supporting the force occupying each area.

c. For aircraft operating in areas adjoining a tactical area of responsibility, the responsible air traffic facility may

provide a flight-following service. This service is to—

- Provide a record of the general area in which specific aircraft are operating.
- Provide the time at which voice radio reports are to be made to the facility for use as a basis for alerting search and rescue elements, when necessary.
- Provide information to aircrews regarding friendly or enemy operations which may affect the flights.

6-5. OTHER CONSIDERATIONS

a. The poor road networks and rugged terrain often associated with stability operations increase the requirement for Army aviation support of land combat forces. Where land forces are located in scattered positions throughout the combat zone, freedom of movement of Army aircraft transporting troops and materiel between these points must be maintained.

b. Stability operations normally are characterized by a reduced air threat. This permits other service aircraft, which normally would be used to counter the enemy air threat, to be used to increase the close air support capability. The increased close air support capability, scattered areas of troop disposition, and increased requirement for surface-to-surface fire support necessitate the close coordination of all fire support activities of the participating services. Accordingly, the airspace management elements of the tactical operations center may be required to broaden their functions. They may need to become more involved in the minute-by-minute coordination which is essential to this type of operation. Where road networks are inadequate or not under the control of friendly forces, there will be increased dependence on aircraft for delivery of supplies and equipment. This may require the establishment of special airways for the exclusive use of these aircraft.

APPENDIX A

REFERENCES

Department of the Army Pamphlets (310-series) should be consulted frequently for latest changes or revisions of references listed and for new publications on subjects covered in this manual.

ARMY REGULATIONS (AR)

AR 95-series	- Army Aviation
AR 310-25	- Dictionary of United States Army Terms (Short title: AD)
AR 310-50	- Catalog of Abbreviations and Brevity Codes

FIELD MANUALS (FM)

FM 1-5	- Instrument Flying and Navigation for Army Aviators
FM 1-51	- Rotary Wing Flight
FM 1-200	- Air Traffic Control Facility Operations and Training
FM 11-50	- Combat Communications Within the Division (How to Fight)
FM 11-92	- Combat Communications Within the Corps (How to Fight)
FM 24-1	- Combat Communications (How to Fight)
FM (C) 32-20	- (C) Electronic Warfare (EW) (U)
FM 44-1 (HTF)	- US Army Air Defense Artillery Employment (How to Fight)
FM 100-5 (HTF)	- Operations (How to Fight)

FM 100-28	- Doctrine and Procedures for Airspace Control in the Combat Zone
FM 100-42	- US Army/US Airspace Management in an Area of Operations
FM 101-5	- Staff Officers' Field Manual: Staff Organization and Procedures

JOINT CHIEFS OF STAFF PUBLICATIONS (JC PUBS)

JCS Pub 8	- (0) Doctrine for Air Defense From Oversea Land Areas
JCS Pub 9	- (0) Doctrine for the Unified Defense of the United States Against Air Attack

STANDARDIZATION AGREEMENTS (STANAG)

STANAG 3736	- Offensive Air Support Operations, ATP 27B
STANAG 3805	- Airspace Control in the Combat Zone, ATP 40
STANAG 3631	- Wartime Air Movement Priority System for NATO Countries

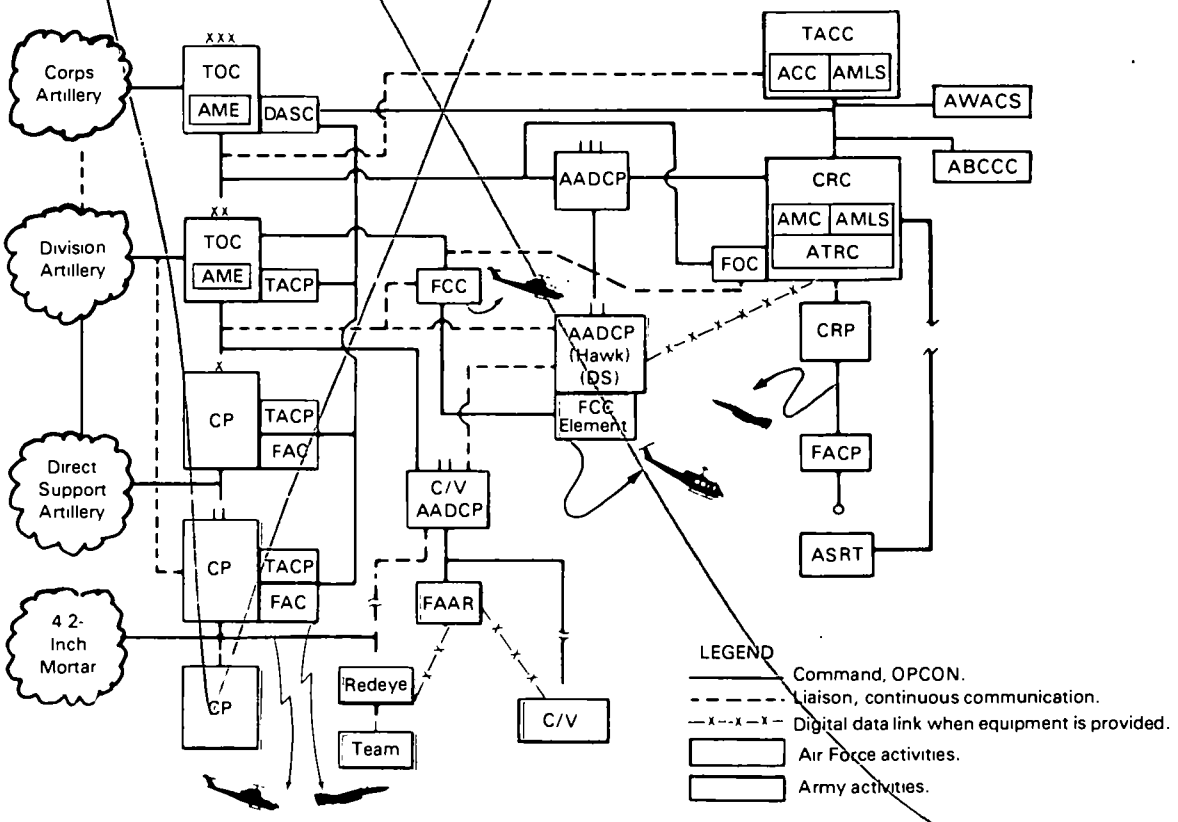
APPENDIX B

AIRSPACE CONTROL SYSTEM ORGANIZATION AND COMMUNICATIONS STRUCTURE

Section I. AIRSPACE MANAGEMENT FACILITIES

B-1. ORGANIZATION-GENERAL

Simply stated, the airspace manager will be the maneuver commander. His staff will keep him apprised of the battle situation and will also provide the interface with other friendly airspace users. Not meant to confuse you or to overcomplicate the interface issue is the diagram below.



NOTE: Organizational structure shown represents Army-Air Force relationships with one corps deployed. Modification will be required for multi-corps operations.

Figure B-1. Airspace control system organization and communications structure.

B-2. TACTICAL AIR CONTROL CENTER (TACC)

The TACC is dedicated and operationally responsive to the Air Force Component Commander/Commander, Air Forces (AFCC/COMAFFOR) for airspace control, ground tactical sensor surveillance, air support coordination and control, and air strike coordination and control. Through the TACC the AFCC/COMAFFOR permits decentralized execution of air missions by subordinate tactical elements to promote mission effectiveness and to enhance responsiveness.

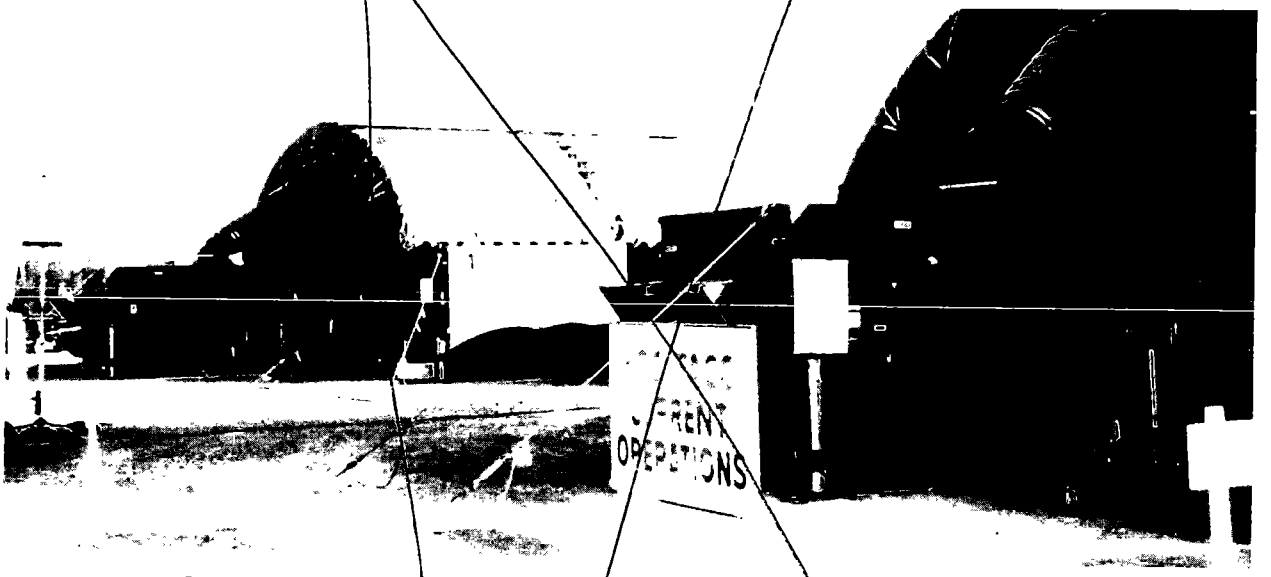


Figure B-2. TACC's transportable operations central (TSQ-92).

Figure B-3. Inside view of typical TACC in action.

B-3. AIRSPACE CONTROL CENTER (ACC)

The ACC is the element within the TACC through which the ACC coordinates and integrates the use of airspace in a combat zone.

B-4. AIRBORNE WARNING AND CONTROL SYSTEM (AWACS)

The AWACS is an airborne radar platform capable of providing all altitude surveillance, warning, and aircraft control. AWACS operation will vary depending on the nature of the threat and the tactical missions being conducted. In locations where a ground tactical air control system (TACS) is present, AWACS will augment and/or extend the range of the control and reporting center (CRC). In the absence of ground TACS elements, the AWACS can operate independently to provide radar surveillance and airspace control in a combat zone as directed by the AFCC/COMAFFOR.

B-5. AIRSPACE MANAGEMENT SECTION (AMS) OF THE BATTLE COORDINATION ELEMENT (BCE)

The AMS, a part of the BCE, located at the tactical air control center provides the airspace control authority (ACA) an agency for planning, coordinating, and integrating activities related to airspace management. Army representation to the AMS at the BCE normally will be provided by the senior Army commander. Corps representatives to the airspace management liaison section (AMLS) at the senior Army headquarters normally will be provided by the appropriate corps commanders from aviation air traffic control (ATC) and air defense staff elements. Personnel selected to staff the AMLS must be intimately familiar with the airspace users' systems and requirements.

B-6. CONTROL AND REPORTING CENTER (CRC)

The CRC is an element of the tactical air control system. It conducts radar control and warning operations within its area of responsibility. The CRC supervises the activities of subordinate radar units and collects, displays, evaluates, and disseminates information on air activities throughout the system. The CRC provides defensive and offensive mission control, navigational and air rescue assistance for friendly aircraft, and threat warning for friendly forces. Also the CRC provides the means for air traffic regulation and identification, and it is the primary airspace management agency in the airspace control area/sector.

Figure B-4. CRC deployed in field location.

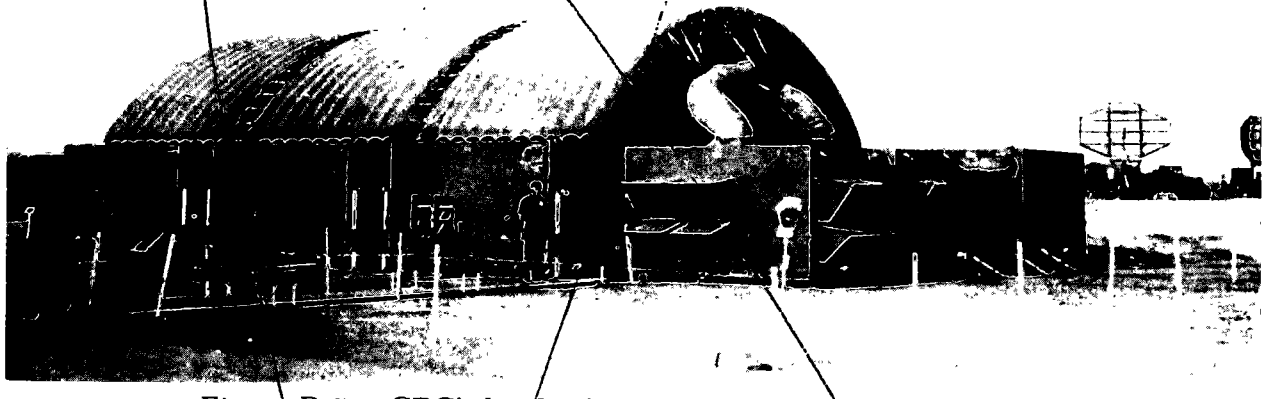


Figure B-5. CRC's hardwall shelter, TSQ-91, with inflatable ceiling.

B-7. AIRSPACE MANAGEMENT CENTER (AMC)

The airspace management center is an element within the CRC. It functions in response to airspace/air traffic requirements as an integral part of the area airspace control system. It is established to control, coordinate, regulate, and identify air traffic operating in an assigned airspace control area/sector. The airspace management center provides continuous cross-coordination, regulation, and integration of the component Services' air operations in accordance with the coordinated rules and procedures established by the airspace control center.

B-8. CONTROL AND REPORTING POST (CRP)

The CRP augments the CRC by extending radar surveillance and control capabilities. A CRP may assume the primary functions of a CRC (including the AMC functions) within its capabilities. The CRP functions as an airspace control facility in an airspace control center.

Figure B-6. CRP employs the same TSQ-91 operations control as the CRC.

B-9. FORWARD AIR CONTROL POST (FACP)

The FACP is a subordinate facility of the CRC or CRP. It consists of lightweight surveillance and control radar to extend system coverage, fill gaps, and provide limited extension of control capability. The FACP functions as an airspace control facility in an airspace control sector.

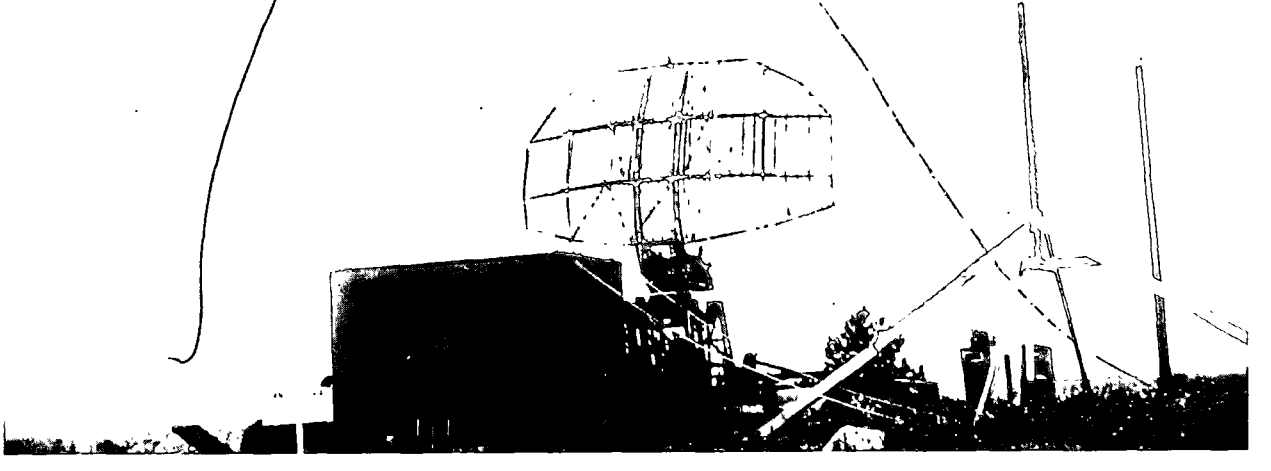


Figure B-7. FACP with AN/TPS-44 radar erected.

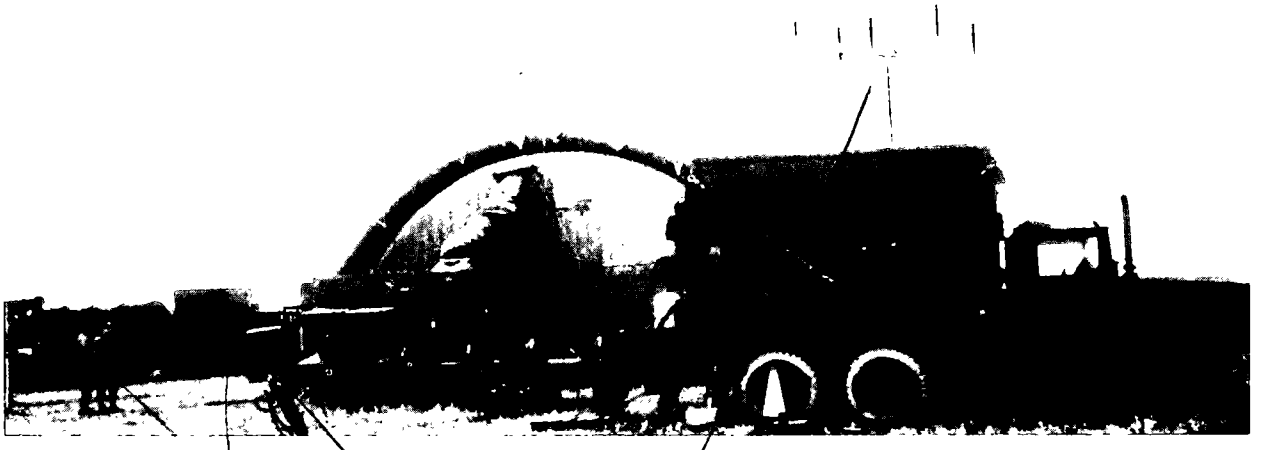


Figure B-8. FACP van is a mobile airspace control facility employed with CRC or CRP.

B-10. AIRBORNE BATTLEFIELD COMMAND AND CONTROL CENTER (ABCCC)

The ABCCC is an airborne command and control element manned by a battle staff commander, aircraft and weapon controllers, and operations, intelligence, and communications specialists. The ABCCC provides the capability for control of tactical air operations in forward battle areas, sometimes beyond the range of the ground-based TACS elements. Its primary function is to serve as a direct extension of the TACC current operations division, but it can provide limited nonradar control of aircraft proceeding to and from designated target areas in the combat zone.

Figure B-9. ABCCC personnel inside EC-130E aircraft, coordinating an operation.

B-11. AIR SUPPORT RADAR TEAM (ASRT)

The ASRT is a mobile unit equipped with precision radar to provide all-weather guidance for tactical strike aircraft against ground targets. It may also be used to position reconnaissance and tactical air-lift aircraft over predetermined coordinates.

B-12. FLIGHT OPERATIONS CENTER (FOC)

The FOC is an Army en route ATC facility. It is collocated with or electronically connected to the Air Force CRC. When the FOC is physically separated from the CRC, the Air Force will furnish communications for connecting the two facilities. The FOC serves as the primary ATC facility for control of Army air traffic in the rear operations area.

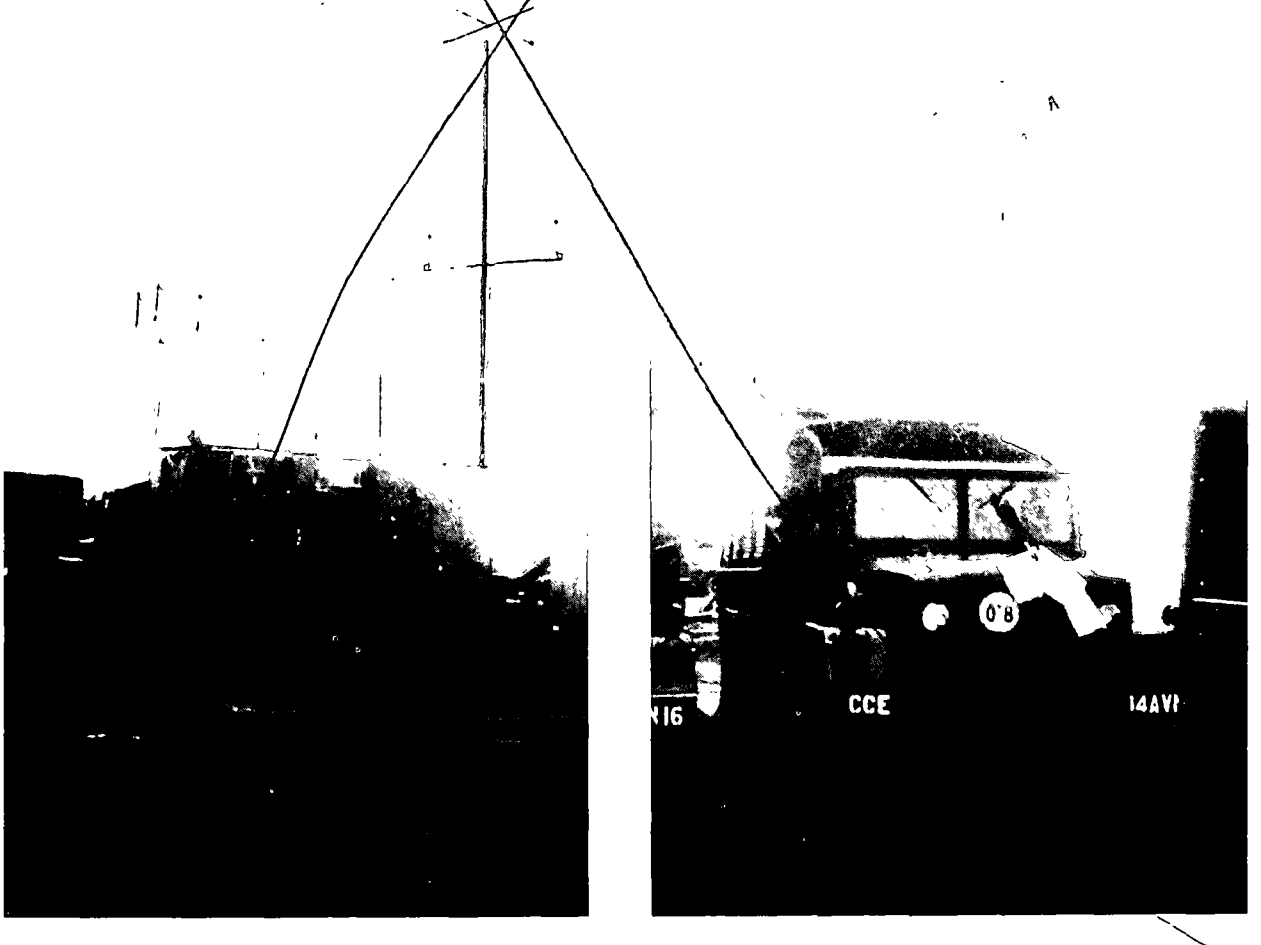


Figure B-10. Flight operations center.

B-13. ARMY AIR DEFENSE ARTILLERY (ADA) TACTICAL OPERATIONS CENTERS (TOC)

Army air defense artillery operations are controlled by ADA TOC. The AADCPs controlling the Hawk and Nike Hercules weapon systems are supported by radars and semiautomatic command and control systems. The division ADA battalion and nondivisional Chaparral/Vulcan battalion fire direction centers (FDC) are manual. They feature full decentralization of engagement authority for the Chaparral/Vulcan air defense artillery weapons. Control authority for Redeye and organic nonair defense weapons capable of engaging aircraft rests with the using unit, subject to compliance with rules and procedures established by the air defense commander.

B-14. FLIGHT COORDINATION CENTERS (FCC)

FCCs are en route ATC facilities employed in the corps rear area and division area. The FCC provides an extension of communications for the FOC. The FCC in the corps rear area designated as the alternate FOC will be collocated with or electronically connected to an Air Force facility (CRC, CRP, or FACP) to insure continuity of the flow of information required for air defense and air traffic management operations. When employed in the division area, the FCC provides a communications link between the terminal facilities of the division airfields, other airfields located nearby, division tactical operations centers, other FCCs, and the FOC. FCCs use the same equipment as the FOC.

B-15. AIR SUPPORT OPERATIONS CENTER (ASOC)

The ASOC is a mobile, air-transportable facility designed to operate with a corps tactical operations center or an independent division tactical operations center. The primary task of the ASOC is to provide a fast-reaction capability to satisfy immediate requests from Army forces for tactical air support.

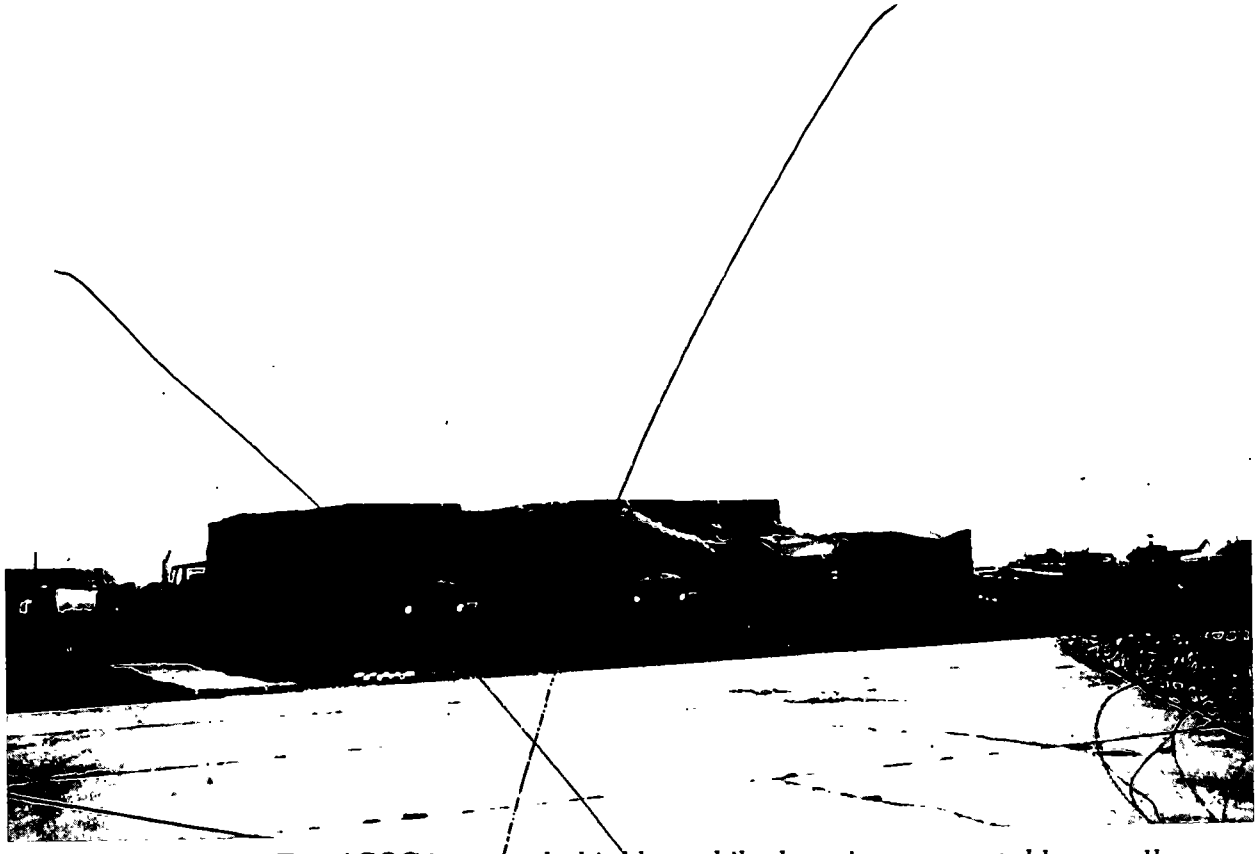


Figure B-11. The ASOC is not only highly mobile, but air-transportable as well.

Figure B-12. The ASOC uses the TSQ-93 transportable hardwall operations central.

B-16. TACTICAL AIR CONTROL PARTY

The tactical air control party is a forward operations element of the tactical air control system. It is attached to each cavalry squadron, maneuver battalion, brigade, regiment, separate brigade, division, and corps. The tactical air control party advises the associated ground commander and staff elements on all aspects of tactical air support operations.

B-17. FORWARD AIR CONTROLLER

The forward air controller, assigned to a tactical air control party and in support of a maneuver force, will control visual flights when employed in close air support strikes. Control may be exercised from airborne or ground observation posts. When airborne or on the ground, the forward air controller will maintain contact with the strike pilot and the appropriate fire support coordinator.

B-18. TACTICAL OPERATIONS CENTER (TOC)

Centralized control and coordination of current tactical ground force operations are accomplished in the TOC.

B-19. INDIRECT FIRE SUPPORT UNITS

Indirect fire support units maintain a system of fire direction centers for internal fire control. Field artillery units provide the fire support coordination centers and the fire support elements. The fire support elements provide the command coordination of fire support on surface targets. Mortar units are directly controlled by maneuver unit commanders, but their fires should be coordinated by the fire support coordination center.

B-20. SUMMARY

Again, the important thing is to know these organizations exist and they are there to help make the airways easier to navigate through—not to complicate the mission. Some individuals may never deal with these facilities because they are involved in front-line operations. What does all this mean to the individual pilot? It means a detailed briefing given by the appropriate supported agency and a call to his operations should take care of any coordination/interface problems.

Section II. ATC EQUIPMENT

B-21. AN/TRN-30(V)

This low-frequency, nondirectional beacon is being produced in a manpack configuration and a tactical semifixed configuration. The AN/TRN-30(V) may transmit on any of 671 channels spaced 500 hertz (Hz) apart, between 200 and 1750 megahertz (MHz). The average operating range is approximately 27 nautical miles (NM) for the manpack version and 110 NM for the semifixed version with the aircraft flying at an altitude of 1,000 feet above ground level (AGL).

Figure B-13. AN/TRN-30(V).

B-22. AN/TSC-61B

The flight coordination central, AN/TSC-61B, is a transportable, shelterized system with aviation communication radios for coordination of en route and local ATC. The AN/TSC-61B is used as an FOC or an FCC. Air-to-ground communications include high frequency/single sideband (HF/SSB), very high frequency-amplitude modulated/ frequency modulated (VHF-AM/FM), and ultra high frequency-amplitude modulated (UHF-AM). The following communications equipment is installed in the AN/TSC-61 B to provide for necessary control and coordination:

- Three AN/ARC-164 UHF/AM radios
- Three AN/ARC-115 VHF/AM radios
- Three AN/VRC-46 VHF/FM radios
- One AN/ARC-102 HF-SSB radio

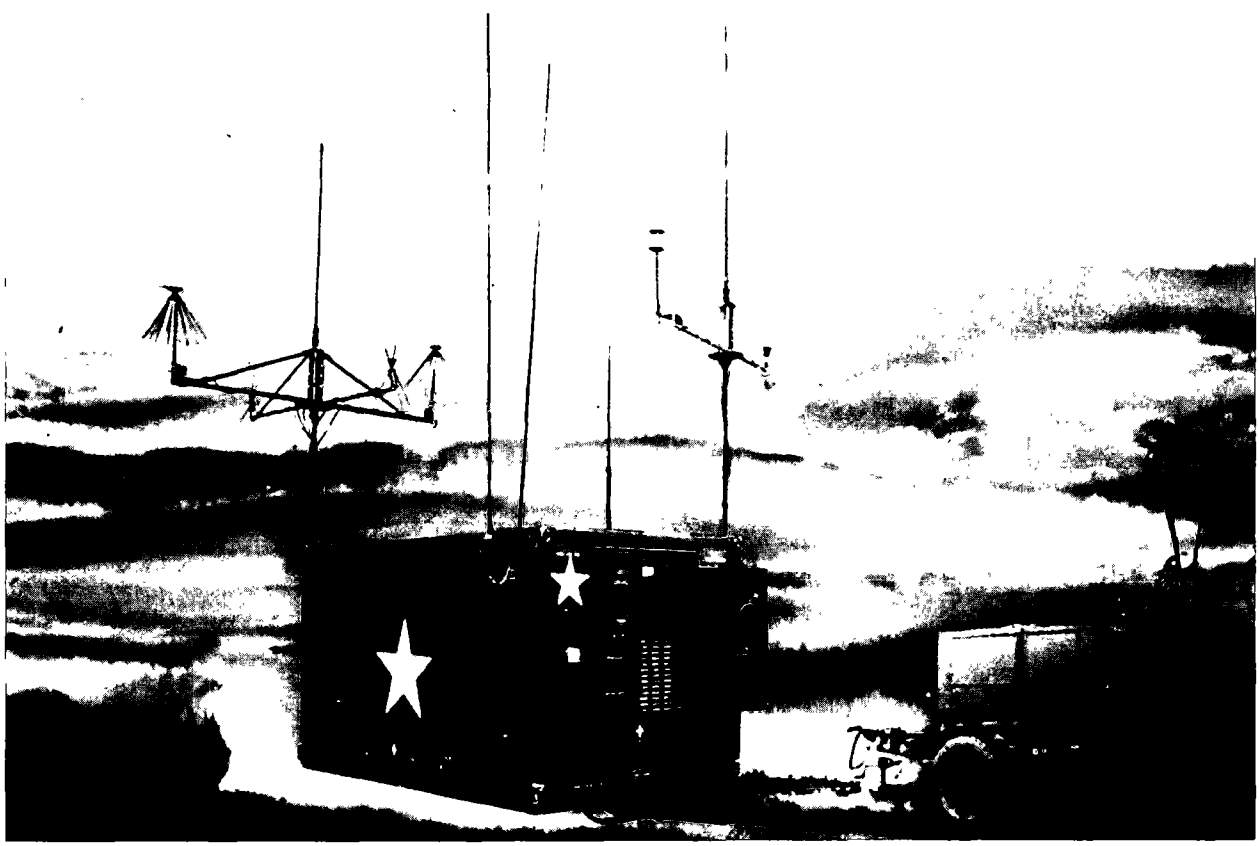


Figure B-14. AN/TSC-61B.

B-23. AN/TSW-7A

The air traffic control central, AN/TSW-7A, which is scheduled to replace the AN/TSW-70, is a transportable facility for controlling terminal air traffic at instrumented airfields in the division and corps rear area. The facility consists of five components—a shelter with communications and meteorological equipment for three controller stations, a 3-meter elevating tower, an environmental control unit, and two generator power units. Air-to-ground communications include HF/55B, VHF-AM/FM, and UHF-AM. The AN/TSW-7A includes the following communications equipment:

- Three AN/ARC-164 UHF/AM radios
- Three AN/ARC-115 VHF/AM radios
- Three AN/ARC-114 VHF/FM radios
- One AN/ARC-102 HF-SSB radio

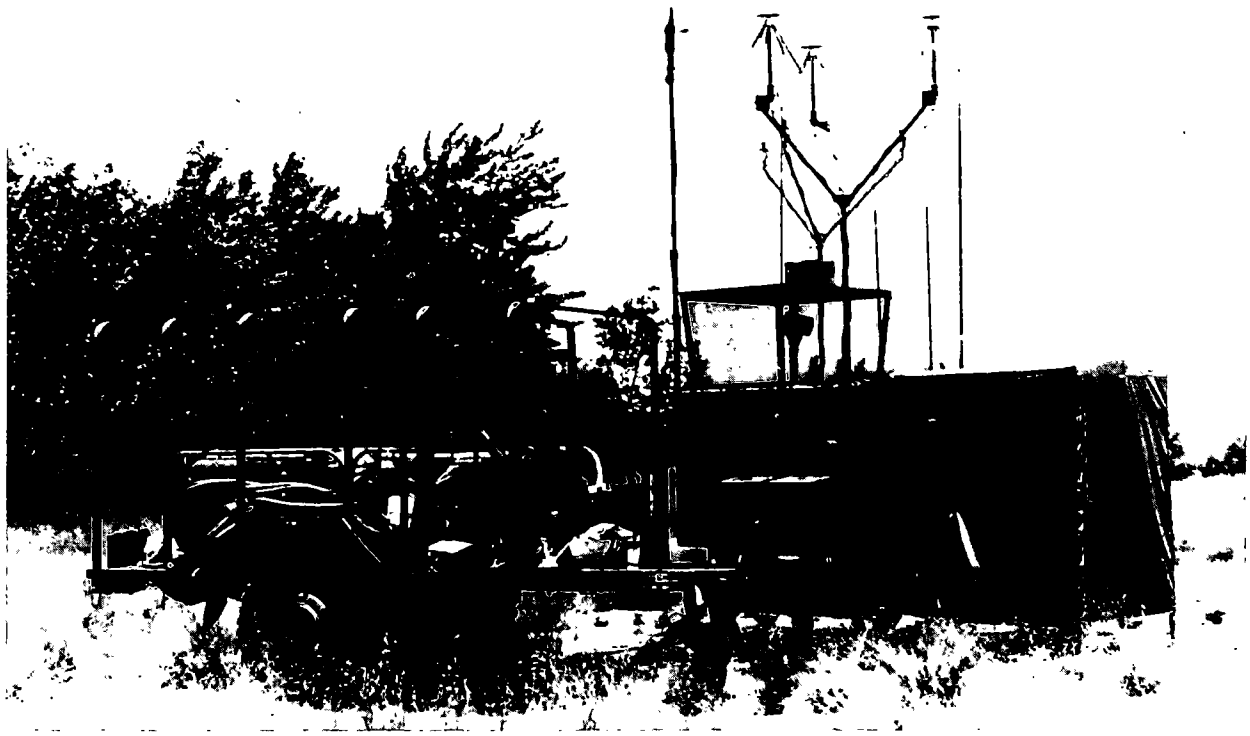


Figure B-15. AN/TSQ-70A.

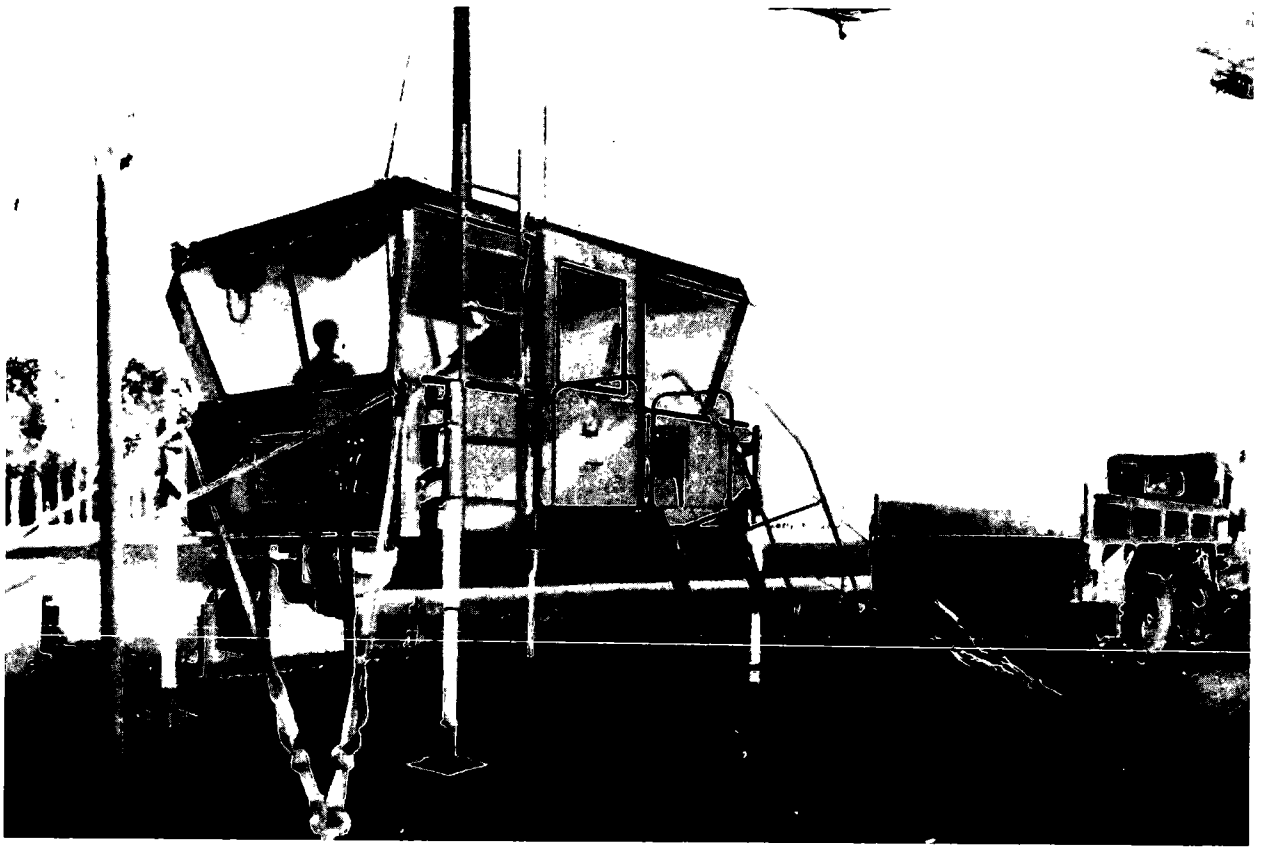


Figure B-16. AN/TSW-7A.

B-24. AN/TSQ-71B

The landing control central, AN/TSQ-71B, is a tactical ground-controlled approach facility which consists of an S-318G shelter which houses the AN/TPN-18 precision approach radar, AN/TPX-44 identification, friend or foe (radar)/selective identification feature (IFF/SIF) equipment, and communication radios. Air-to-ground communications include VHF-AM/FM and UHF-AM. Communications equipment installed in the AN/TSQ-71B is:

- Three AN/ARC-164 UHF/AM radios
- Three AN/ARC-115 VHF/AM radios
- Three AN/VRC-46 VHF/FM radios

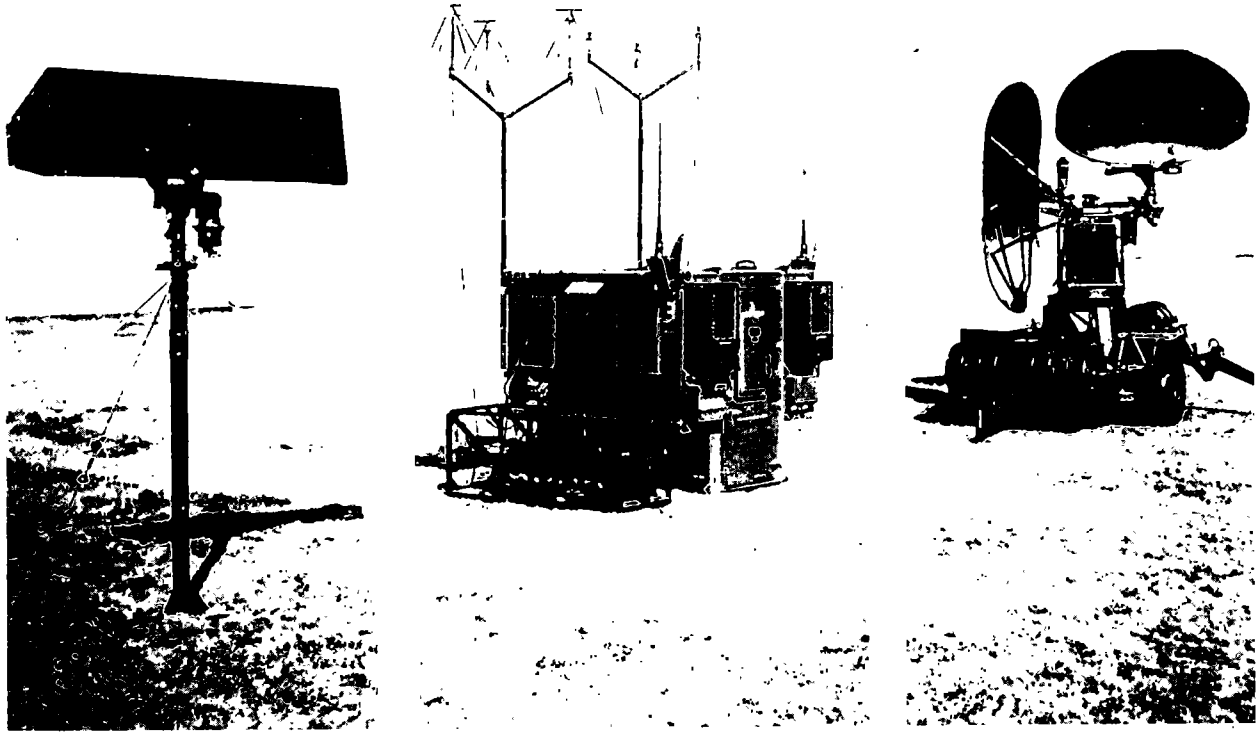


Figure B-17. AN/TSQ-71B.

B-25. AN/TSQ-97

The AN/TSQ-97 is a man-portable ATC facility which contains communications and meteorological equipment for tactical landing areas. The equipment can be transported by two men and set up for operation within 10 minutes after emplacement. Its radios and meteorological instruments can be operated on generator power and on battery power. Air-to-ground communications include VHF-AM/FM and UHF-AM. The AN/TSQ-97 has the following communications equipment:

- One AN/ARC-114 VHF/FM radio
- One AN/ARC-115 VHF/AM radio
- One AN/ARC-164 UHF/AM radio

Figure B-18. AN/TSQ-97.

APPENDIX C

MISSIONS AND FUNCTIONS

Section I. AIR TRAFFIC CONTROL (ATC) UNITS

Specific information concerning personnel and equipment authorization, capabilities, and allowances may be found in applicable tables of organization and equipment (TOE). The following information expands on the mission and functions of air traffic control units.

C-1. HEADQUARTERS AND HEADQUARTERS DETACHMENT, ATC GROUP (TOE 1-222)

a. **Mission.** The ATC group's mission is to provide staff administration, operational and logistical planning, and support for Army air traffic control within a theater of operations. In addition, the group headquarters provides command supervision of assigned or attached ATC units.

b. **Assignment and Employment.** The group is assigned to a theater army communications command or to a major task force as required. Elements of the group normally are placed in direct support of the corps and division commands to which they provide ATC support.

c. **Functions.**

(1) Provide assigned or attached ATC units with personnel and equipment to operate and maintain—

- Tactical ATC terminal facilities at communications zones (COMMZ), corps, and division instrumented landing sites.

- An en route ATC system of flight operations centers (FOC) and flight coordination centers (FCC) in the corps and division area of operations.

(2) Provide ATC liaison personnel to theater level Air Force and Army airspace management elements.

(3) Provide personnel and equipment to inspect and evaluate ATC facilities and operations.

C-2. ATC COMPANY (COMMZ) (TOE 1-223)

a. **Mission.** The ATC company (COMMZ) has the mission to provide terminal air traffic control, navigational aids (NAVAID), air warnings, and other assistance to in-flight aircraft.

b. **Assignment and Employment.** The ATC company (COMMZ) is normally assigned to the ATC group. It is normally employed with its platoons placed in direct support of aviation units operating airfields/heliports in the COMMZ requiring ATC instrumentation services. Platoons of the company operate from dispersed locations within an assigned area. They normally are collocated with supported aviation units for security and to enhance responsiveness. They receive medical, logistical, transportation, POL, food service, and administration and maintenance services support from the supported unit and its support activities.

c. **Functions.**

(1) Provide terminal ATC services to include tower, approach control, ground-controlled approach (GCA) radar, and terminal NAVAIDs at up to four COMMZ Army airfields and/or heliports.

(2) Provide coordination for Army aircraft entering the corps area en route ATC system from the COMMZ.

(3) Provide coordination with airspace management liaison section (AMLS) of the Air Force tactical air coordination center (TACC) and other theater airspace control elements as directed.

(4) Platoon-sized elements and individual teams may be added or deployed independently to meet particular ATC requirements.

(5) Organic radio and echelon above corps signal communications systems are used to transmit and receive weather, notices to airmen (NOTAM), aircraft flight clearances, and operational data. (See appendix D.)

(6) Perform organizational maintenance on organic equipment and up to general support (GS) level on-site maintenance on noncommon ATC/NAVAID equipment.

(7) The ATC company (COMMZ) is normally organized with a company headquarters, supply section, and two ATC platoons—each consisting of a platoon headquarters, two tower teams, and two GCA radar teams.

C-3. HEADQUARTERS AND HEADQUARTERS DETACHMENT, ATC BATTALION (CORPS) (TOE 1-226)

a. **Mission.** The mission of the ATC battalion is to provide staff administration, operational, and logistical planning and support for Army air traffic control within division and corps rear areas. In addition, the battalion provides command supervision of assigned or attached ATC units.

b. **Assignment and Employment.** ATC battalions are normally assigned to an ATC group. The ATC battalion (corps) may be attached to an independent corps or Army task force as required. The battalion is employed in direct support of and receives its operational requirements from the corps or task force commander. Two ATC companies (forward) are normally assigned to the battalion to provide the ATC and/or assistance needed by supported aviation elements in the corps and division areas. The battalion headquarters is located in the vicinity of the corps or tasks force headquarters it supports. The battalion commander also serves as the corps Army ATC officer and is the primary corps staff advisor on the utilization and employment of ATC resources. The battalion staff coordinates with the corps staff and provides appropriate ATC liaison personnel for interface with airspace managers and users on air traffic control requirements and procedures.

c. **Functions.**

(1) Provide assigned or attached ATC units with personnel and equipment to operate and maintain combat support ATC facilities at—

- Division instrumented landing sites.
- Corps instrumented airfields/heliports.

(2) Provide en route ATC consisting of one flight operations center in the corps rear area and FCCs in the division and corps rear areas.

(3) Provide navigational beacons for use at airfields and/or heliports and en route ATC.

(4) Provide ATC liaison personnel to the airspace management system at the Air Force command reporting center (CRC) and the airspace management element (AME) of the corps tactical operations center (CTOC).

(5) Provide personnel and equipment to inspect and evaluate ATC facility equipment and maintenance operations.

(6) Subordinate units perform up to GS level on-site maintenance on assigned ATC/NAVAID equipment.

C-4. ATC COMPANY (FORWARD) (TOE 1-227)

a. **Mission.** The mission of the ATC company (forward) is to provide terminal and en route ATC, navigational aids, air warnings, and other assistance to in-flight aircraft.

b. **Assignment and Employment.** Two ATC companies (forward) are normally assigned to each ATC battalion (corps). One ATC company (forward) normally is employed with its platoons placed in direct support of corps aviation operations while the other ATC company (forward) employs its platoons in direct support of division aviation operations. ATC platoons operate from dispersed locations within an assigned area and normally are collocated with supported aviation units for security and to enhance responsiveness. Platoon leaders at ATC platoons providing ATC support at the division instrumented landing site also serve as ATC liaison officers with the division airspace management element at the division tactical operations center. They provide assistance for ATC planning and coordination of division airspace user requirements and operations. The platoons receive medical, logistical, transportation, POL, food service, and administrative and maintenance services support from the supported unit and its support activities.

c. **Functions.**

(1) Provide terminal ATC services to include tower, approach control, GCA radar and terminal NAVAIDs at corps or division landing sites.

(2) Provide one FOC to manage the corps en route ATC system.

(3) Provide FCC and NAVAIDs for employment in the corps/division en route ATC system.

(4) Organic radio and corps and division area signal communications systems are used to transmit and receive weather, NOTAMs, aircraft flight clearances, and operational data. (See appendix D.)

(5) Platoon-sized and individual teams may be added or deployed independently to meet particular ATC services.

(6) Provide liaison and coordination with AMEs as directed.

(7) Perform organizational maintenance on organic equipment and up to GS-level, on-site maintenance on noncommon ATC/NAVAID equipment.

d. **Summary.** The ATC company (forward) is normally organized with a company headquarters, supply section, and three ATC platoons—each consisting of a platoon headquarters, one tower team, one GCA radar team, and one en route FOC/FCC team. One of the FOC/FCC teams in the corps rear areas is designated as the FOC. As such, it provides the interface and coordination between the Army air traffic management system and the Air Force control and reporting center. Tactical tower and GCA teams are added to an ATC platoon as required to support additional tactical aviation operations at Army landing sites.

Section II. AIR TRAFFIC CONTROL TEAMS

C-5. ATC LIAISON TEAM

a. **Mission.** The mission of the ATC liaison team is to provide technical assistance to airspace management and control personnel in matters pertaining to Army ATC policies and procedures and the use of Army ATC facilities and systems.

b. **Functions.**

(1) Coordinate ATC operational requirements between airspace management and ATC management personnel.

(2) Recommend deployment and positioning of airfield/heliports and ATC facilities in support of airspace management and aviation operations.

(3) Assist in the development, planning, implementation, and integration of Army ATC policies and procedures with Army combat forces commanders and the airspace management authority.

(4) Prepare ATC operational inputs to command standing operating procedures and operational orders.

(5) Participate in the preparation of Army en route navigational and terminal approach charts and plates.

C-6. FLIGHT OPERATIONS CENTER

a. **Mission.** The mission of the FOC is to manage the Army en route ATC system. The FOC also coordinates the use of air routes, terminal control zones, restricted operational zones, coordinating altitudes and ATC lines, and related operations with the airspace management authority and other airspace users. The FOC is collocated with or electronically connected to the Air Force control and reporting center.

b. **Functions.**

(1) Supervise the operations of subordinate flight coordination center.

(2) Relay flight clearance requests between the Air Force CRC and the originator.

(3) Relay weather and emergency warning information.

(4) Maintain an air route overlay displaying such information as air routes, ATC lines, preplanned artillery fires and nuclear strikes, restricted zones, location and designation of ATC facilities and navigational beacons/aids, location of airfields and heliports, and coordination altitudes.

C-7. FLIGHT COORDINATION CENTER

a. **Mission.** The mission of the FCC is to extend the capabilities and communication of the FOC within the Army en route ATC system. The FCC is the interface between the FOC, Air Force corps, and Army terminal ATC facilities. It supports the FOC in its coordination activities. In addition, the FCC provides en route instrument flight rules (IFR) air traffic control, flight-following, advisories, weather, and air warning information to aircraft

operating in its area of responsibility. When an FCC has been designated an FOC, it will assume the missions of, and perform the functions outlined for, the FOC (para C-6).

b. **Functions.**

(1) Maintain an air route overlay with information (similar to the FOC) as applies to its area of responsibility.

(2) Provide en route IFR ATC and advisory services to aircraft operating in its area of responsibility.

(3) Relay flight clearances between the FOC and the originator.

(4) Assist in search and rescue operations.

(5) Maintain flight data records.

C-8. TOWER TEAM

a. **Mission.** The mission of the tower team is to provide instrumented terminal ATC services at Army airfields and/or heliports.

b. **Functions.**

(1) Provide manual approach control and departure control services.

(2) Provide weather observation, wind conditions, and altimeter information.

(3) Provide terminal and ground control services.

(4) Provide beacon/navigational aids.

(5) Provide information on landing site surface, heading, length, and condition.

(6) Provide information on obstructions.

C-9. GROUND-CONTROLLED APPROACH TEAM

a. **Mission.** The mission of the GCA team is to provide radar approach control and precision approach radar services for aircraft during periods of adverse weather (instrument meteorological conditions), or high density aircraft operations.

b. **Functions.**

(1) Provide aircraft vectoring assistance.

(2) Provide precision approach radar letdown and landing assistance.

(3) Provide identification, friend or foe (radar) (IFF) of aircraft.

C-10. TACTICAL TOWER TEAM

a. **Mission.** The mission of the tactical tower team is to provide a jump capability for the tower team. It also provides ATC for temporary periods of time at helipads supporting medical evacuation, resupply and refueling points, or command post locations.

b. **Functions.**

(1) Provide manual approach and departure control services.

(2) Provide beacon/navigational aids.

(3) Provide information on landing surface heading and condition.

(4) Provide information on obstructions.

APPENDIX D
COMMUNICATIONS

D-1. GENERAL

a. Air traffic control (ATC) combat support effectiveness encompasses training, established procedures, coordination, functional equipment, logistical support, plus adequate communications. ATC units supporting Army air operations are prepared with good training, operational procedures, and equipment; however, logistical support, coordination, and communications continue to operate during the battle to effect ATC effectiveness.

b. Communications doctrine for ATC must provide for reliable near real-time transmission of command and control information between widely dispersed ATC units as well as rapid coordination and integration of operations between ATC facilities and airspace managers and users. Backup systems and equipment must be available in case of primary system/equipment failure or other emergency.

D-2. CATEGORIES

The communications required in ATC units fall into these three general categories:

a. Air traffic regulation.

b. Command, administrative, and logistical lines with higher and subordinate headquarters and support/supported units.

c. Coordination between airspace management and ATC facilities.

D-3. ECHELONS

a. ATC units and facilities are employed at three echelons within the theater of operations. These echelons are the—

- Communications zone (COMMZ).
- Corps.
- Division.

b. Communications in support of ATC operations are employed within each of these echelons as well as between adjacent echelons at the corps and division levels.

D-4. COMMUNICATIONS MEANS

The communications means employed for support of ATC operations include—

a. Multichannel radio/cable.

b. Radio teletypewriter (RATT).

c. Single-channel, amplitude-modulated/frequency-modulated (AM/FM) voice radio.

D-5. MULTICHANNEL RADIO/CABLE

a. Multichannel radio/cable voice (telephone) common and sole-user (dedicated) circuits are provided over command and area signal systems provided by COMMZ, corps, and division signal units. These circuits are terminated between switchboard equipment or ATC systems/equipment organic to ATC units, and communications systems/equipment supporting or organic to other command and control units or elements.

b. Sole-user circuits are required to provide for real-time coordination of airspace operations between ATC facilities and airspace management elements throughout the theater of operations. Such coordination includes—

- Implementing airspace restrictions.
- Integrating airspace user activities.
- Requesting and issuing flight clearances.
- Assisting search and rescue operations.
- Issuing aircraft warning.
- Processing of emergency in-flight reports.

c. Multichannel radio/cable voice (telephone) circuit requirements for ATC units at the COMMZ, corps, and division echelons are shown in figures D-1, D-2, and D-3, respectively.

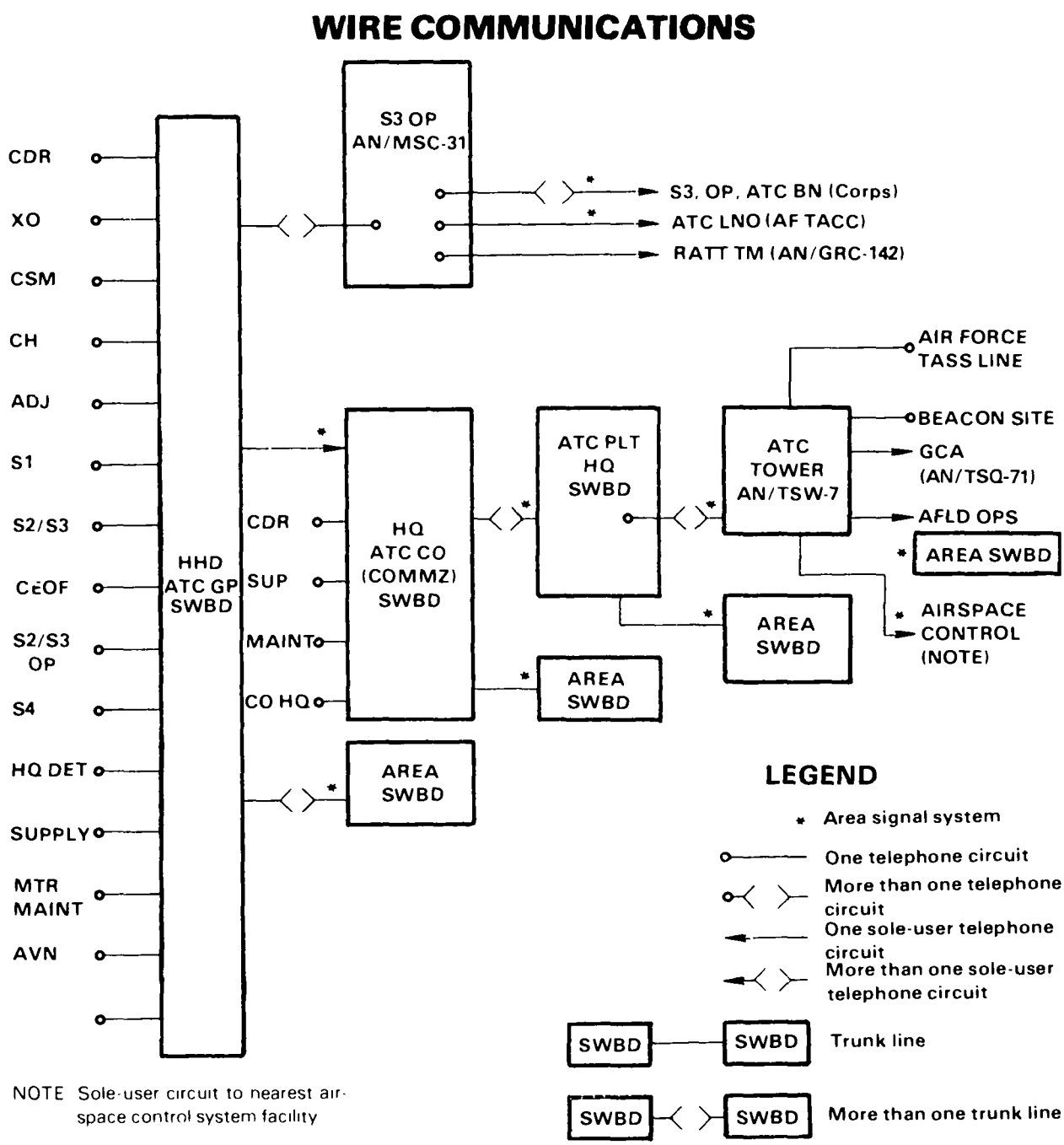


Figure D-1. COMMZ common-user and sole-user ATC circuits.

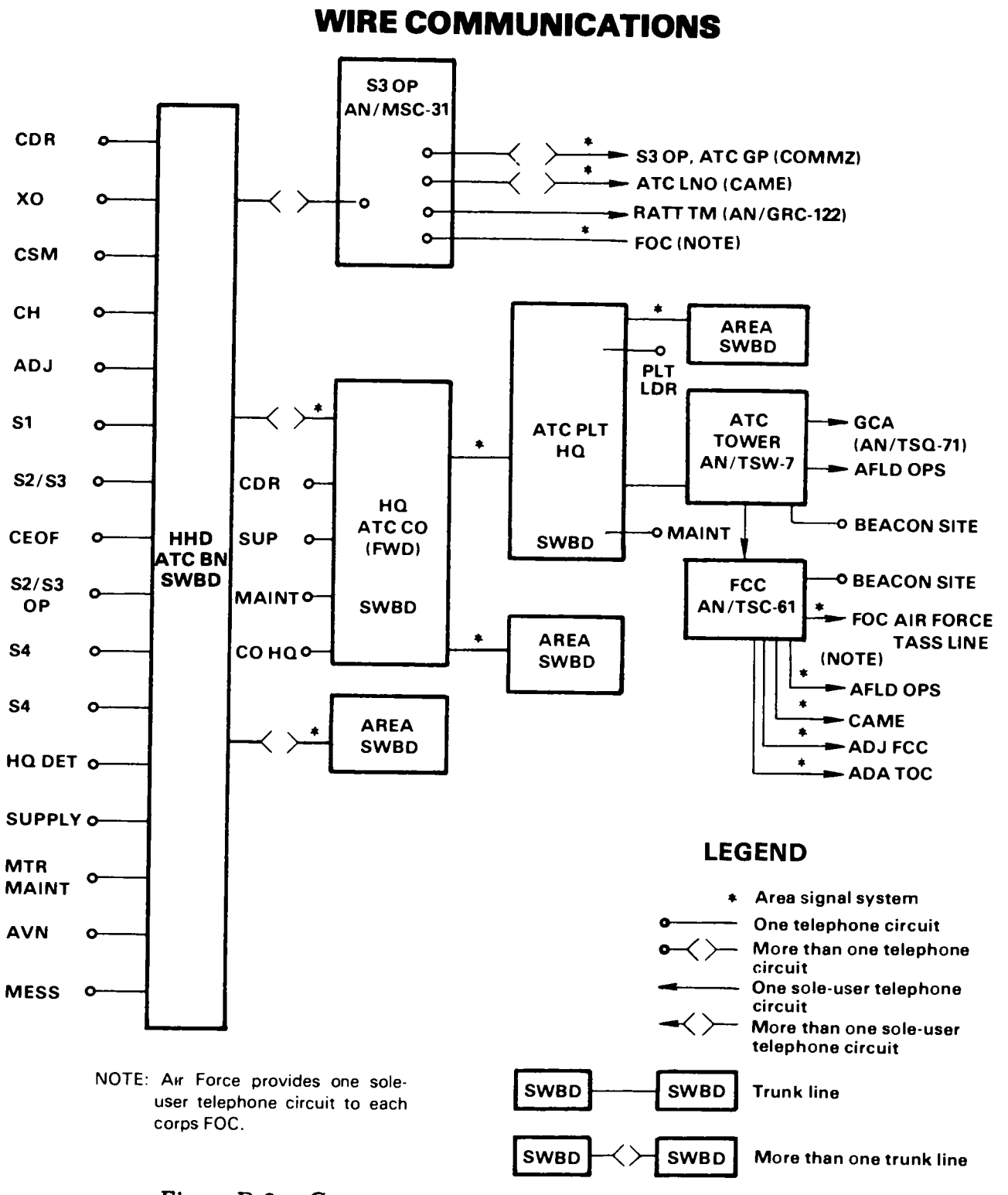


Figure D-2. Corps common-user and sole-user ATC circuits.

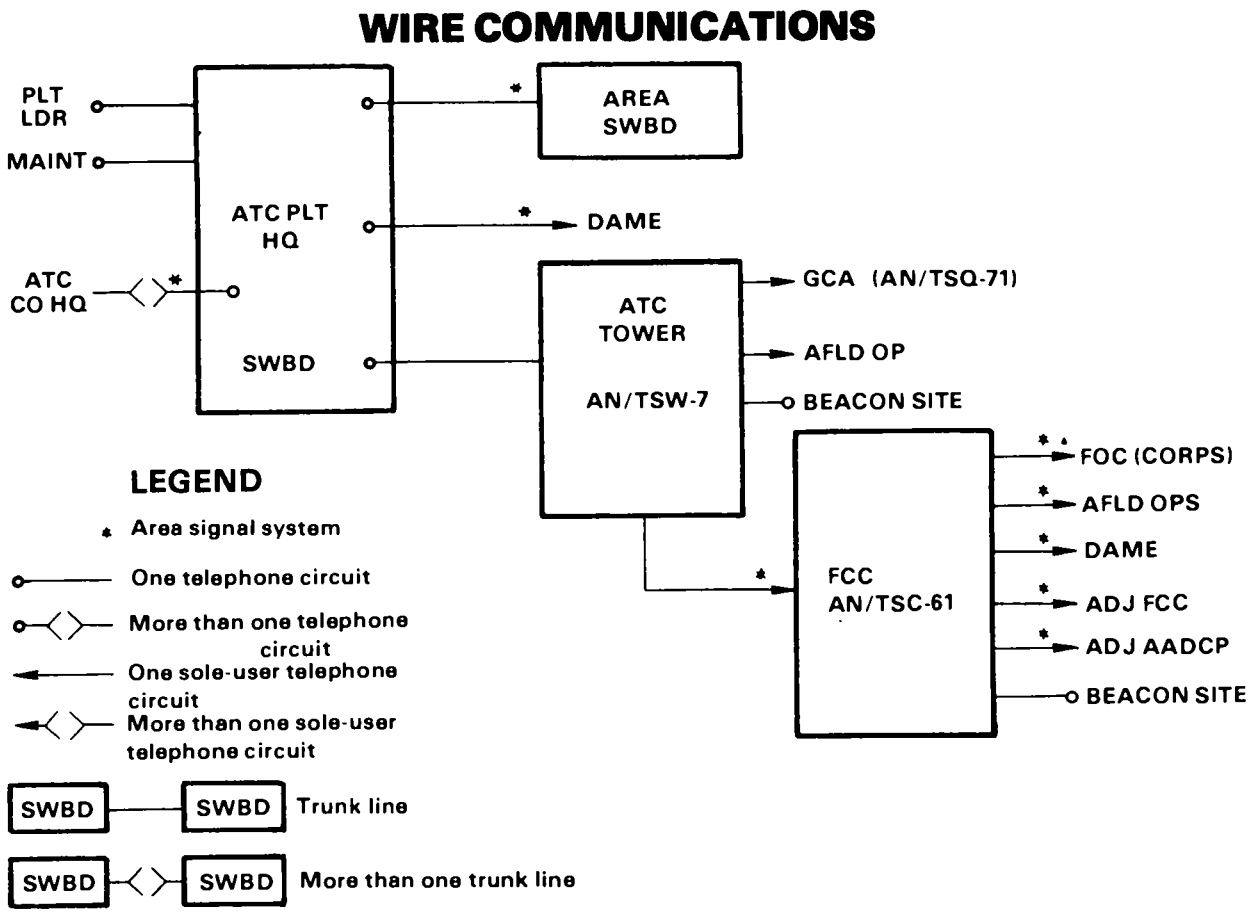
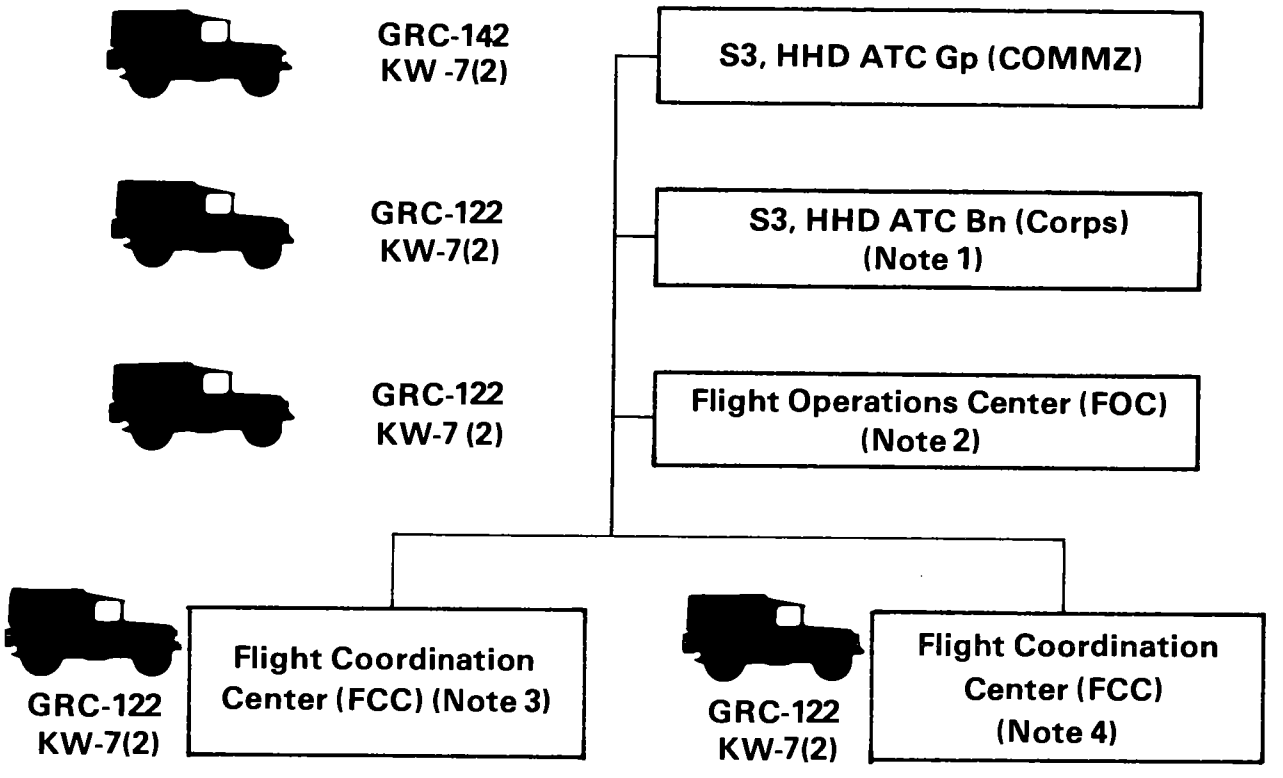


Figure D-3. Division common-user and sole-user ATC circuits.

D-6. RADIO TELETYPEWRITER

a. Radio teletypewriter terminals are organic to the ATC group headquarters, ATC battalion headquarters, and ATC platoons of the ATC company (forward) which are deployed in the corps and division rear areas. The RATT stations are used to establish a RATT net providing the means to pass secure operational information, to include notices to airmen concerning ATC facility and navigational aids location and operational status, and weather data. This RATT net will also be used to pass command and control information during periods of rapid deployment of ATC platoons or when other means of communication cannot be rapidly established or their operational range has been exceeded.

b. Radio teletypewriter terminals employed in the ATC RATT net are shown in figure D-4.



NOTE 1: One terminal per each corps.

NOTE 2: One terminal per corps en route system.

NOTE 3: One terminal per each ATC platoon FCC in corps rear area.

NOTE 4: One terminal per each ATC platoon FCC in division area.

Figure D-4. Air traffic control RATT net.

D-7. SINGLE-CHANNEL AM/FM VOICE RADIO NETS

Single-channel AM/FM voice radio nets are used to provide communications means for ATC units and facilities to meet various operational purposes. These operational purposes include—

- Command and control.
- Air traffic regulation.
- Airspace coordination.

D-8. COMMAND AND CONTROL NETS

Command and control nets are provided, using AN/VRC-12-series FM radios organic to ATC units. These nets are shown in figures D-5, D-6, and D-7.

D-9. AIR TRAFFIC REGULATION NETS

Air traffic control nets are used to provide air traffic regulation, flight-following, advisories, weather information and air warnings to aircraft. These nets are provided using various combinations of AN/VRC-series FM and avionics very high frequency/ultra high frequency (VHF/UHF) AM radios installed in tactical ATC facilities. These nets are shown in figure D-8.

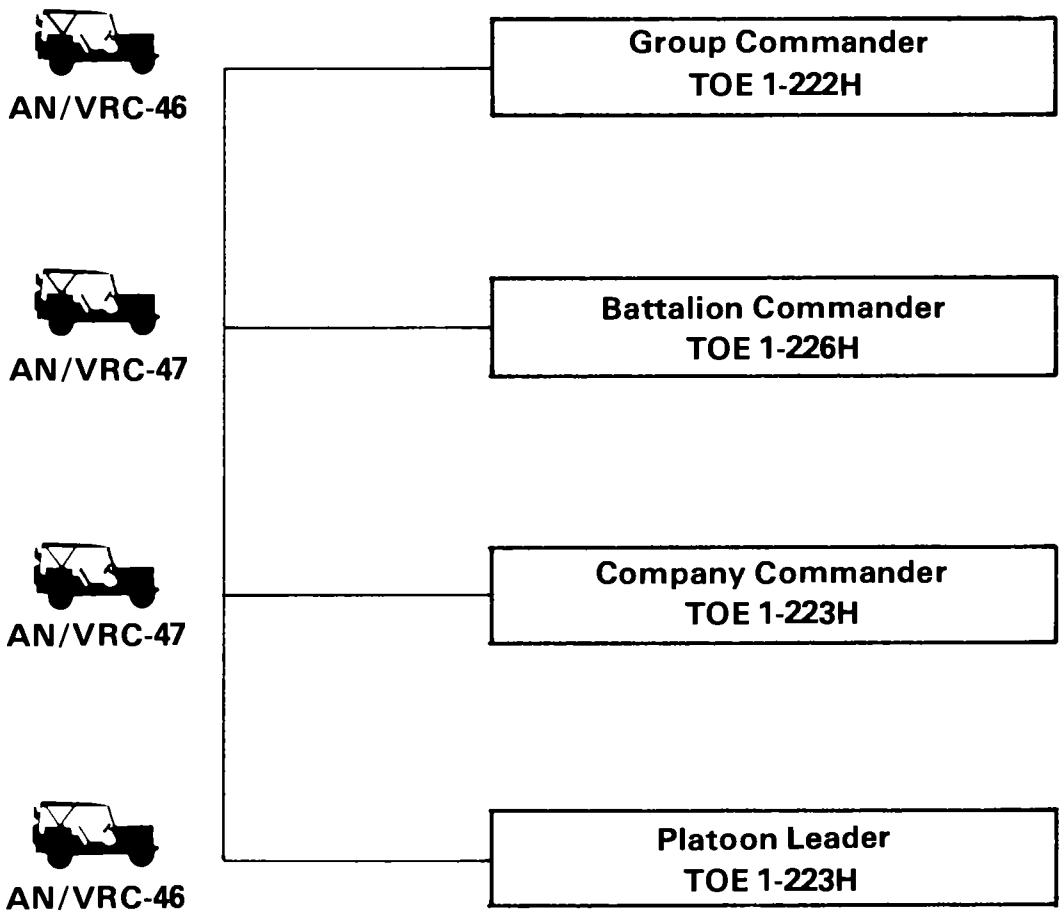


Figure D-5. ATC group and ATC command (COMMZ) command and control nets.

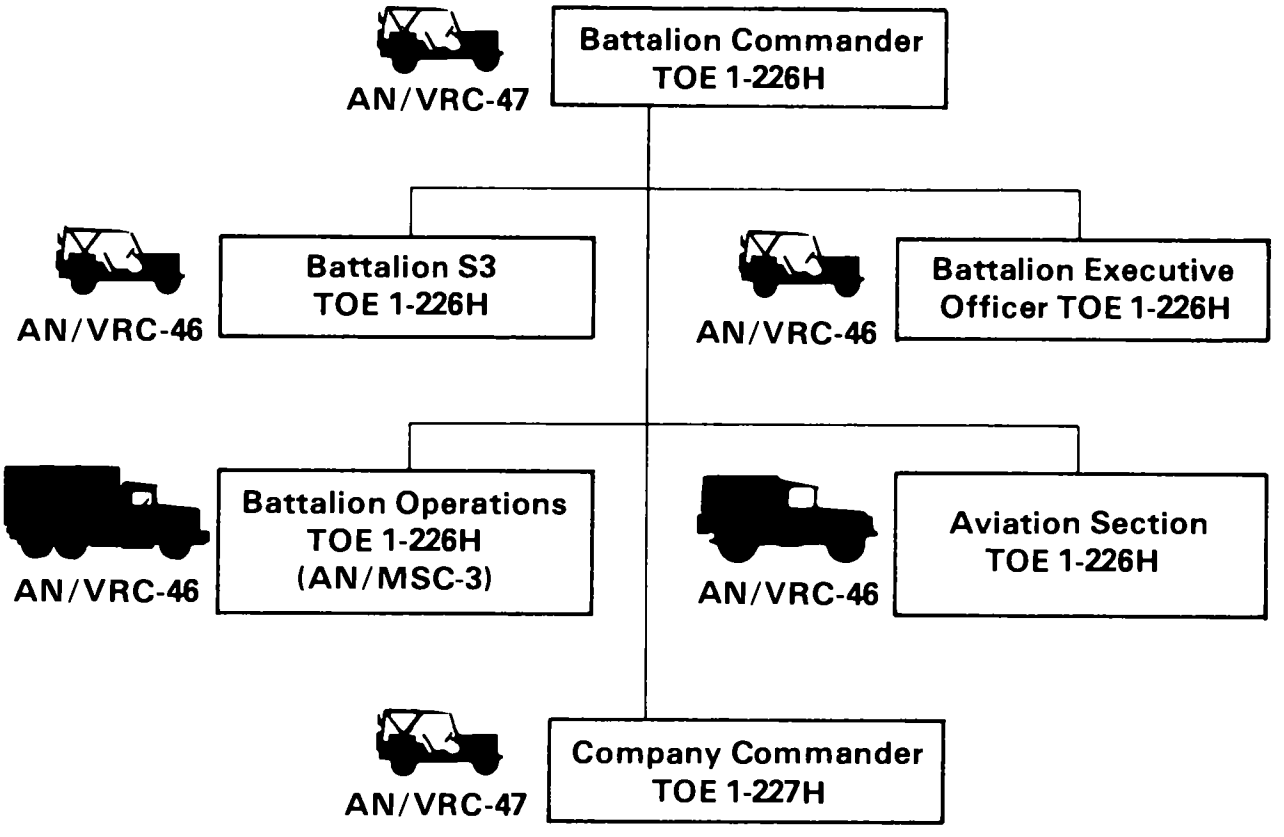


Figure D-6. ATC battalion command and control net.

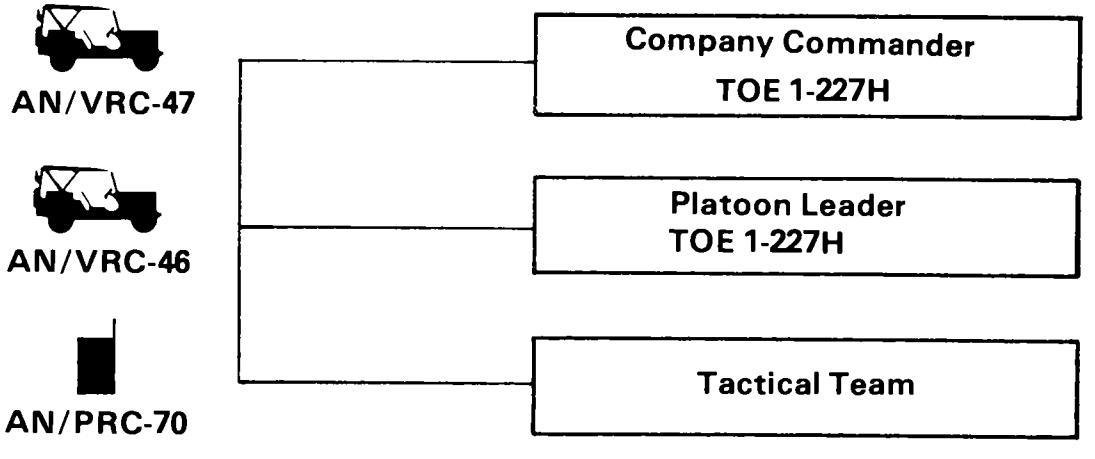


Figure D-7. ATC company (forward) command and control net.

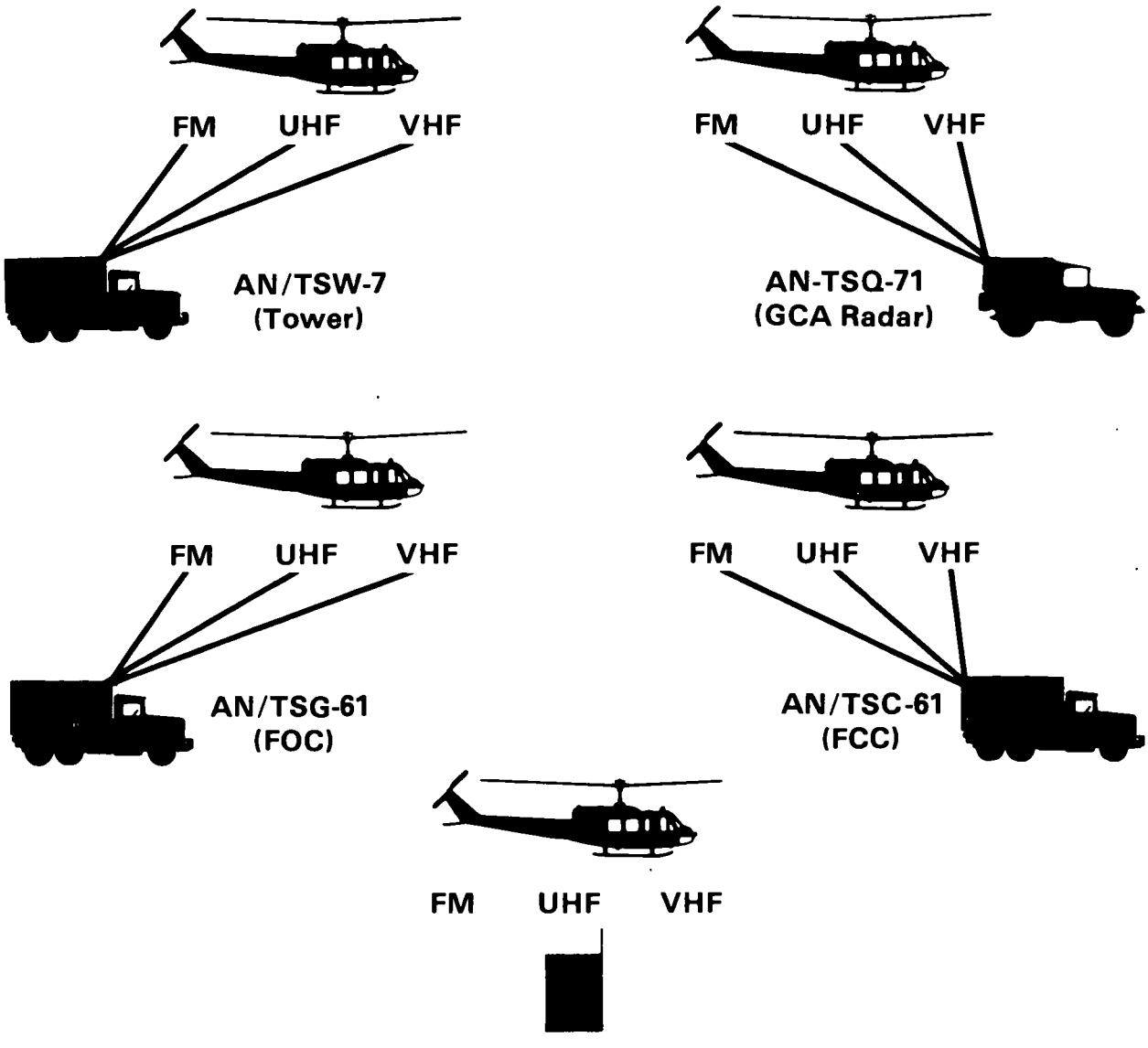


Figure D-8. Air traffic regulation nets.

D-10. AIRSPACE COORDINATION NET

a. Airspace coordination is normally provided over dedicated and sole-user telephone circuits, over multichannel radio/cable systems, or over local wire means. However, when time, distance, or other factors preclude the use of these means, the requirement to provide

real-time coordination between ATC facilities or these facilities and airspace management facilities, may be provided for over high frequency (HF) single-sideband voice radio equipment installed in operations or ATC facilities.

b. The facilities organic to ATC units which may operate in the open airspace coordination net are shown in figure D-9.

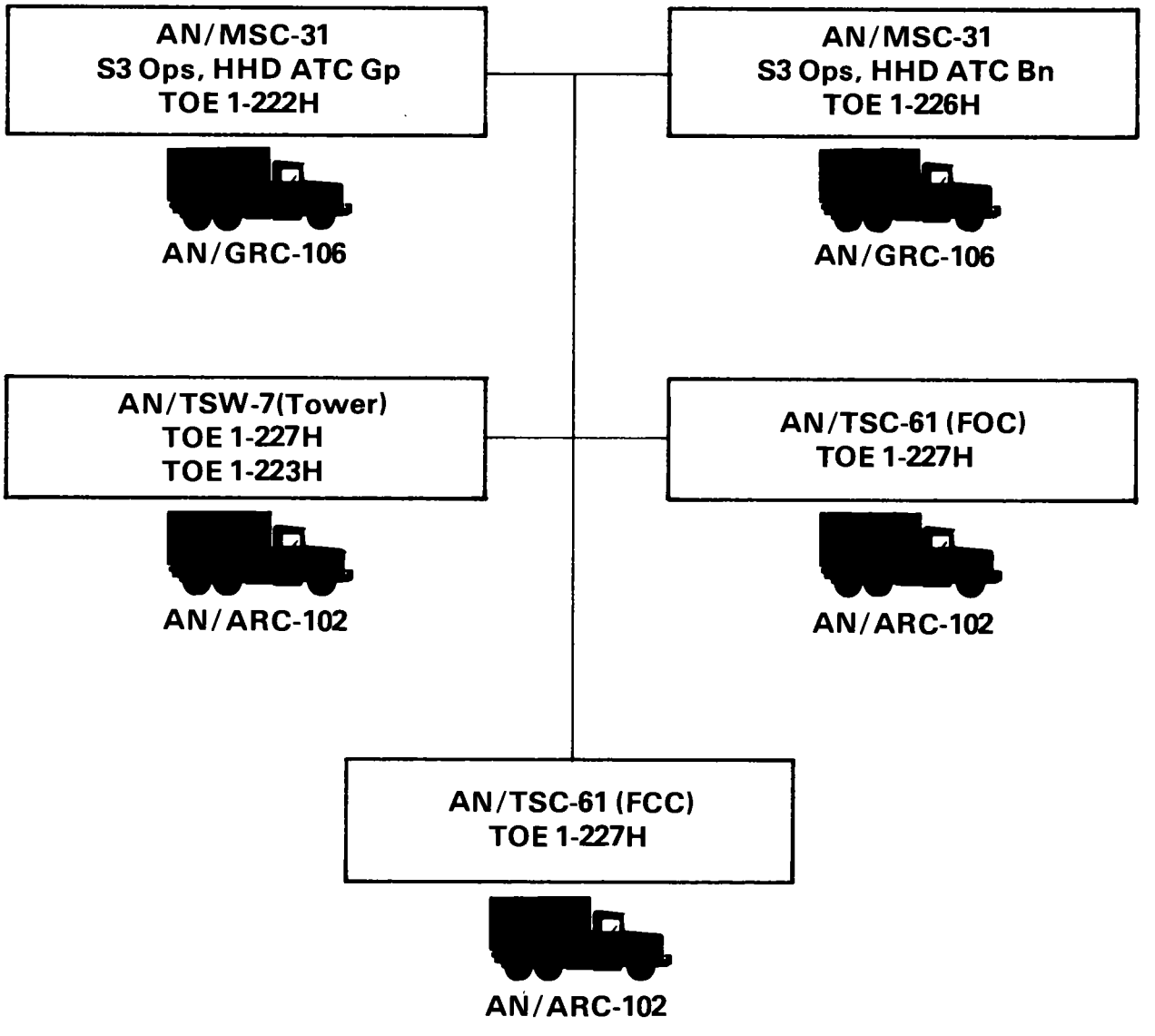


Figure D-9. Airspace coordination net.

APPENDIX E

EXAMPLE OF DIVISION STANDING OPERATING PROCEDURES FOR AIRSPACE MANAGEMENT

(Classification)

3d Mech Div
Fort Carson
1 Feb 198__

STANDING OPERATING PROCEDURES
NO 1

AIRSPACE MANAGEMENT

Section I

GENERAL

1. **References.** Annex A (References).

2. **Purpose.** To establish procedures for the coordination, integration, and regulation of airspace in the division area of operations (AO).

3. **Concept.**

a. The Commander, 29th Tactical Air Force (TAF), is designated the airspace control authority and the area air defense commander. The provisions incorporated in these standing operating procedures (SOP) are in accordance with the airspace management procedures established in the 29th TAF tactical standing operating procedures (TSOP) and the I Corps TSOP. The division airspace management element (DAME) will continually coordinate with the corps airspace management element (CAME) to insure an unimpeded flow of essential information concerning the use of airspace in the division AO. The authority of the division over each airspace user will vary with the situation.

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b. Rotary wing and fixed wing aircraft operate at low level in visual meteorological conditions (VMC) and in a procedural rather than electronic control environment. Tactical air force supporting the division normally will be in a radar advisory/control environment in radio contact with tactical air control systems elements. Coordination procedures must not cause delays in mission employment and they must not restrict the movement of support aircraft or the tactical commander's control of organic fire.

c. These SOPs are designed to identify functional responsibilities in a system based on the principle of management by exception. To accomplish this end, organizations assigned, attached, or under the operational control (OPCON) of this division will insure that their procedures are such that any necessary routine coordination is minimal. In addition, contingent procedures will be established to insure continuity of operations in a degraded airspace control system.

d. The DAME develops and coordinates procedures for the use of airspace by the division. Airspace management priorities and execution details will be identified in the airspace utilization annex to the division plans/orders.

e. The DAME is a manual planning-and-management facility with limited information-handling capabilities; therefore, the principle of resolving potential-user conflicts by plans, SOPs, and management by exception, is emphasized. Plans and SOPs will delegate the necessary authority to the lowest possible level of command for taking action to resolve an observed conflict. The provisions of these SOPs will be followed during all command post exercises/field training exercises (CPX/FTX) to promote familiarity with procedures.

Section II

COMMAND AND STAFF RELATIONSHIPS/RESPONSIBILITIES

1. **Command.**

a. **I Corps.** The Commander, I Corps, is responsible for coordinating and establishing an integrated joint airspace control system with the airspace control authority. The CAME serves as the focal point at corps for the coordination of airspace management functions.

b. **3d Mech Div.** The Commander, 3d Mech Div, is responsible for conducting airspace management for the division.

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c. **Brigade/Battalion.** Normally there is no requirement for a special staff element at maneuver brigade or battalion dedicated to airspace management. The maneuver commander is responsible for coordinating his airspace activities when those activities may impact on other airspace users.

d. **1st Bn (Hawk, TRIAD), 458th ADA.** The Hawk battalion is designated in direct support of the division. The commander, in coordination with the division air defense officer, will consider established division priorities in employment of his unit and accommodate airspace management functions as cited in Appendix B (Integration Plan—AADCP with an FCC Element). The following are special requirements for the airspace management function:

(1) Insure that the division air defense officer and the DAME are provided low-altitude coverage diagrams as soon as possible to facilitate air defense coverage and airspace management integration.

(2) Establish and maintain manual plotting and voice communication facilities as backup for digital data links.

(3) Coordinate air defense matters with the Chaparral/Vulcan liaison officer to include air defense warnings, weapons control status and rules of engagement changes, and hostile and friendly aircraft data.

(4) When required, provide liaison personnel to operate in the division tactical operations center.

e. **1st Plt (ATC), 101st ATC Co (Forward).** The air traffic control (ATC) platoon is designated in direct support of the division. The platoon leader also performs duties as the ATC liaison officer to the DAME. The following functions are performed by the ATC platoon:

(1) Terminal ATC service at the division heliport.

(2) En route ATC service in the division area of operations.

2. **Staff.** Staff responsibilities and command relationships are as specified in FM 101-5, unless otherwise indicated in these SOPs.

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a. **ACofS, G3, Operations.** The ACofS, G3, will insure that these SOPs are kept current, and that they are followed during training exercises at all levels. He exercises staff supervision over airspace management and the DAME; and he insures that appropriate instructions pertaining to airspace management are published in the airspace utilization annex. He will insure that necessary personnel, required to staff the DAME, are represented in the division tactical operations center and that necessary communications are available for mission accomplishment.

b. **ACofS, G4, Logistics.** The ACofS, G4, will provide the DAME with supporting airlift information pertaining to airspace management to include—

(1) Preplanned and immediate airlift support requests and the priorities of approved requests.

(2) Location of logistic installations.

(3) Other combat service support information, as required, relating to air movements.

c. **ACofS, G2, Intelligence.** The ACofS, G2, will provide the DAME with intelligence information pertaining to airspace management to include—

(1) Enemy air defense capabilities and threat to include radar range/altitude coverages and missile/gun capabilities.

(2) Enemy air threat (number, type, tactics, and capabilities of aircraft).

(3) Location of enemy nuclear, biological, or chemical attacks.

(4) Possible enemy capabilities to counter airspace management aids, such as communications, radars, and beacons.

(5) Possible enemy tactics for employing aircraft in the division area of operations.

(6) Likely enemy aircraft avenues of approach.

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d. **Air Defense Officer.** The division air defense officer is the Commander, 1st Bn (C/V, TRIAD, 441st ADA). To assist in the division airspace management effort, he will—

(1) Provide required air defense artillery (ADA) personnel and necessary equipment to staff the DAME.

(2) Provide liaison personnel to the 1st Bn (Hawk, TRIAD), 458th ADA, Army Air Defense Command Post (AADCP).

(3) Inform the DAME of AADCP and fire unit locations.

(4) Provide the DAME and the Hawk battalion AADCP with alert information derived from the forward area alerting radar (FAAR) and/or the forward area Chaparral/Vulcan crews.

(5) Advise the division commander on all matters pertaining to division air defense, to include recommending air defense priorities.

(6) Coordinate with the Hawk battalion to insure integration of the Hawk and short-range air defense weapons.

e. **Aviation Officer.** The division aviation officer serves as the principal aviation advisor to the division. To assist the DAME, he will—

(1) Arrange for required aviation personnel and necessary equipment to staff the aviation element of the DAME.

(2) Determine flight plan requirements for division aircraft operating under VMC and assure adherence to theater instrument meteorological conditions (IMC) procedures.

(3) Establish procedures with ATC liaison officer (LO) for integrating all Army aircraft entering or leaving division AO.

(4) Recommend positioning of navigational aids and procurement of additional aids organic to division tactical teams.

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(5) In conjunction with ATC liaison officer, establish the air traffic regulation system for the division and disseminate this information to all aviation elements operating within the division AO.

(6) Coordinate with the CAME, along with the ATC LO, for integrating additional airspace management elements with division elements.

f. **Air Traffic Control Liaison Officer.** The ATC liaison officer serves as the principal air traffic control advisor to the division. He will—

(1) Provide ATC support at the division airfield.

(2) Serve as a liaison officer with the airspace management element of the division tactical operations center.

(3) Provide assistance for air traffic control planning and coordination of division airspace user requirements and operations.

(4) Establish coordination between the flight coordination center (FCC), 1st Bn (Hawk, TRIAD), 458th ADA, AADCP.

(5) Provide a tactical team to position navigational aids as recommended by division aviation officer.

(6) Recommend the site of the division main airfield and the requirement for a terminal control zone and positioning of the FCC.

(7) Coordinate with the ATC liaison officer at the CAME for integrating the division FCC with flight operations center (FOC)/control and reporting center (CRC)/control and reporting post (CRP) facilities.

(8) Coordinate with division aviation officer on all matters pertaining to air traffic control in the division AO.

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g. **Fire Support Coordinator.** The fire support coordinator for the division is the Commander, 3d Mech Div Arty. He provides the following airspace management information to the DAME through the fire support element.

(1) Significant preplanned indirect fires.

(2) Field artillery battery locations.

h. **Electronic Warfare Intelligence Operations Center.** The electronic warfare intelligence operations center in support of the airspace management effort will—

(1) Provide the DAME estimates on enemy jamming capabilities and location of emitters when known.

(2) Provide the DAME time and location of jamming operations by division elements or by higher headquarters that may affect division airspace management facilities or aids.

(3) Inform the DAME of other electronic warfare activities that might impact on airspace management.

(4) Be prepared to react to hostile or friendly electronic warfare activities that degrade the airspace management system.

i. **Chemical Officer.** The chemical officer will provide the DAME with information concerning—

(1) Friendly and enemy nuclear strikes with effective wind messages.

(2) Radiation fallout plots.

(3) Enemy employment of nuclear, biological, and chemical weapons.

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Section III

FUNCTIONS

1. **Division Tactical Operations Center.** The division tactical operations center is the command installation in which necessary personnel and communication facilities are centralized to plan, control, and coordinate tactical operations. Within the division tactical operations center are located the personnel necessary to coordinate airspace management functions. The DAME serves as the focal point for coordinating airspace management activities at the division and with adjacent and higher headquarters.

a. **Division Airspace Management.** The DAME receives information and requirements necessary for the management of airspace in the division AO through coordination with the CAME, fire support element, tactical air control party, aviation officer, air defense officer, G2/G3 elements, and liaison personnel. This list of personnel and elements should not be construed as limiting the DAME sources of information. The DAME will—

(1) Through the correlation of airspace management information and data received, identify and resolve potential conflicts concerning the use of airspace within the division AO.

(2) Develop and maintain the airspace utilization map.

(3) Develop and maintain recommended low-level transit routes (LLTR) through the division AO and provide them to the CAME.

(4) Maintain and disseminate current information of restricted areas, standard-use Army air routes, flight corridors, air defense weapons-free zones, significant preplanned field artillery fires and nuclear strikes, airmobile operations, other major aviation operations, and preplanned close air support strikes and reconnaissance missions.

(5) Relay information concerning air defense warnings, weapons control status and rules of engagement, and identification criteria pertaining to air defense and Army aviation activities within the division AO.

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(6) Maintain a current picture of the air defense and aviation posture within the division AO and advise the commander and staff on such matters.

(7) Maintain the status of required airspace management aids and disseminate information concerning their location/use as required.

(8) Coordinate with the CAME concerning establishment of, and recommended changes to, coordinating altitudes.

(9) Disseminate information as obtained concerning enemy air and air defense activity.

(10) Coordinate all requirements for flight plans, restricted areas, air defense artillery weapons-free zones, and flight rules and procedures.

(11) Coordinate division requirements for airfield and terminal control zones with the CAME.

(12) Provide airspace management information relevant to development of air-movement plans and insure that air-lift requirements for use of airspace are included in airspace utilization annexes to operations plans and orders.

(13) Provide the following information, as a minimum, to the flight operations center/ flight coordination center:

(a) Low-level transit routes, standard-use Army air routes, and flight corridors.

(b) Requirements, if any, for navigational aids and terminal facilities in the division AO.

(c) Restricted areas, air defense artillery weapons-free areas, and air defense weapons control status and rules of engagement.

(d) Coordinating altitude.

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(e) Field artillery and air defense artillery fire unit locations.

(f) Requirements, if any, for flight plans and position reports.

(g) Division operation plans and operation orders.

(h) Identification, friend or foe/selective identification feature (IFF/SIF) codes.

(i) Requirements, if any, for broadcasting air warnings; e.g., friendly nuclear strikes, friendly close air support strikes, significant artillery concentrations.

b. **Fire Support Element**. The fire support element will provide to the DAME:

(1) Location of the fire support coordination line.

(2) Information concerning location of significant preplanned indirect fires (major preparation and final defensive fires) and nuclear strikes.

(3) Location of significant immediate fires.

(4) Location of major fire units (battery and higher) as soon as they are known.

(5) Location of planned nuclear fires.

c. **Tactical Air Control Party**. The tactical air control party will inform the DAME of Air Force activity within the division AO and of known Air Force aircraft transiting the division AO at low levels.

d. **G2 Air**. G2 Air informs the DAME of all preplanned low-level reconnaissance flights that will penetrate the airspace over the division AO. Information must include time, route of flight, altitude, number of aircraft involved, and electronic countermeasures to be employed.

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2. **Division Flight Coordination Center.** The division FCC is responsible for providing en route, flight-following service upon request for Army aircraft within the division AO and serves as a point of access into the airspace control system. As a minimum, flight-following services will be provided for aircraft crossing an airspace control boundary. The FCC will be positioned to provide maximum coverage to aircraft operating in the division AO. The FCC will—

a. Relay request and/or clearances for instrument flight rules (IFR) flights and take necessary action to resolve observed conflicts concerning the use of airspace.

b. Integrate aircraft entering the division AO.

c. Receive en route air traffic from, and hand over traffic to, adjacent air traffic control facilities.

d. Coordinate with the Hawk AADCP.

e. Relay information concerning airspace management as required by the DAME.

f. Maintain current status of terminal facilities, navigational aids, restricted areas, coordinating altitudes, standard-use Army air routes, and other information pertinent to the air traffic operations.

g. Notify the FOC of division aircraft proposing penetration of the coordinating altitude.

3. **Army Aircraft.**

a. Army aircraft assigned/attached to division and operating within the division AO will not be required to file flight plans during VMC. Employment of Army aviation in the brigade AO may require terrain flying techniques under the control of the brigade commander. Aviation unit operations will provide advance entry information to aircraft entering the brigade area. Aircraft operating within the division AO may request flight-following from the FCC. Pilots will be familiar with the supported unit's tactical situation.

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b. Army aircraft intent on entering or leaving the division AO will file flight plans with the FCC or the FOC as appropriate. These flight plans may be filed through unit operations or by radio with the FCC/FOC.

c. Army aircraft operating under VMC within the division AO do not require air traffic control en route clearances.

d. Army aircraft operating under IMC will receive clearances from the appropriate air traffic control facility (FCC in the division area of operation/flight operations center/control and reporting center/control and reporting post in the corps rear operations area.)

e. Army aircraft operating in the division AO must comply with published IFF mode/code settings. An IFF transponder checkout can be obtained from the AADCP/FCC element.

f. Army aircraft penetrating above the coordinating altitude will notify the FCC either by direct communication or through unit operations. Notification will be made as far in advance as possible.

g. On request, Army aircraft may obtain radar-supported emergency en route advisory services from the AADCP/FCC element and USAF.

4. **Communications.** Annex C.

Brown
MG

OFFICIAL:

/s/Jones
Jones
G3

Annexes: A—References

B—Integration Plan—AADCP with an FCC Element

C—Communications

Distribution: A

(Classification)

(Classification)

ANNEX A TO SOP NO 1—3d Mech Div

REFERENCES:

1. 29th TAF TSOP.
2. I Corps TSOP.
3. AR 310-25.
4. AR 310-50.
5. FM 1-103.
6. FM 6-20.
7. FM 11-50.
8. FM 11-92.
9. FM 24-1.
10. FM (C) 32-20.
11. FM 44-1.
12. FM 44-3.
13. FM 44-6.
14. FM 71-100.
15. FM 100-26.
16. FM 100-28.
17. FM 100-42.
18. TC 100-15.
19. FM 101-5.
20. JCS Pub 1.
21. JCS Pub 2.
22. JCS Pub 8.
23. TOE 37H.

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ANNEX B (INTEGRATION PLAN—AADCP WITH AN FCC ELEMENT) TO SOP NO 1—3d Mech Div

1. **Purpose.** This annex provides the procedures for integrating the 1st Battalion, 458th ADA, AADCP, into the airspace management system of the division. It also includes responsibilities, equipment, and personnel requirements.

2. **Concept.** The FCC supporting the division is essentially a manual facility for flight-following. Although the AN/TSQ-71 is located at the division airfield, it has a primary function of ground-controlled approaches for IMC. It has a limited radar surveillance coverage of the division. The direct support Hawk battalion radars with digital data link, real-time input from Air Force and/or associated fire units may provide increased low-altitude radar coverage for the FCC. For example, emergency navigational assistance during unexpected IMC or avoidance headings for unexpected conflicts, such as immediate close air support strikes or enemy air activity, could be provided. The feasibility of the concept will be dependent on the friendly/enemy air situation and availability of the Hawk surveillance radar to provide assistance to the FCC.

3. **Responsibilities.**

a. The Commander, I Corps, will assign tactical missions to Hawk battalions assigned to the corps when the area air defense commander has delegated corps the authority for employment of Hawk units. The 1st Bn (Hawk, TRIAD), 458th ADA, is designated the Hawk battalion in direct support of the division.

b. The Commander, 3d Mech Div, will, in consonance with recommendations from his air defense officer, aviation officer, ATC platoon leader, and Hawk battalion commander, insure communication is made available between the Hawk AADCP and FCC.

c. The division operations officer will insure proper coordination between division tactical operations center elements and the AADCP/FCC by arranging required communications in accordance with Annex C (Communications).

d. The Commander, 1st Bn (Hawk, SP), 458th ADA, will insure that acccommodations are made in the battalion AADCP communication with the FCC. When possible, one of the air defense operations officers in the AADCP should be aviation qualified. The commander will insure that ADA personnel are properly trained to function with the FCC element and that a liaison team is provided to the division tactical operations center to facilitate planning and operations.

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ANNEX B (INTEGRATION PLAN—AADCP WITH AN FCC ELEMENT) TO SOP NO 1—3d Mech Div

4. **Operational Procedures.** Figure E-1 shows a physical arrangement of the Hawk AADCP. Chaparral/Vulcan liaison is also shown to indicate the close coordination required with Chaparral/Vulcan units in the overall airspace management system of the division. The figure shows the primary AN/TSQ-38 fire distribution van with two radar consoles and the separate backup manual AADCP. Radio communications will be established to the division FCC on the FCC net (FM), thus facilitating communications with the FCC and Army aircraft.

a. **Personnel.** The Chaparral/Vulcan liaison officer is integrated into the manual AADCP. Data received from the Hawk fire units, CRC/CRP, and the collocated acquisition radar are displayed on two display/control consoles of the AN/TSQ-38. The operator on the left display is concerned primarily with the air defense fire distribution and the operator on the right display, with surveillance. The combined mission of the two operators is to monitor/control the air battle. The operator on the right display, when practicable, should be an ADA aviation-qualified officer to facilitate ADA/aircraft coordination. The remaining personnel are an ADA operations officer, an ADA fire control operator, and two ADA plotters—all located in the manual AADCP.

b. **Information Flow.** Air traffic coordination functions are performed by the ADA personnel based on data displayed on the right console. The data is converted to a grid system common to aircraft and ground operations. Based on common grid data, the AADCP coordinates actions with the FCC as required. Data from the left display console is passed to the manual AADCP where it is plotted for presentation. Based on this data, air activity reports are provided to the Chaparral/Vulcan AADCP and the DAME. The Chaparral/Vulcan liaison officer will broadcast selected hostile/friendly warnings to division air defense units and others capable of monitoring the tactical air warning net (when established). Priority warnings can be rebroadcast from the Chaparral/Vulcan AADCP over existing nets to fire units/squads. Additionally, weapons control status is passed from the area air defense commander through the CRC/CRP to the DAME and the Hawk and Chaparral/Vulcan AADCP, and is broadcast directly over the tactical air warning net. Change in status will be verified by authentication.

c. **Priorities.** In performing its functions, the AADCP will observe the following priorities:

(1) Air defense mission.

(2) Emergency information to pilots.

(3) Emergency directional assistance (vectoring).

(4) Identification and correlation.

(5) Transponder checkout.

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ANNEX B (INTEGRATION PLAN—AADCP WITH AN FCC ELEMENT) to SOP NO 1—3d Mech

d. **Equipment (Non-TOE to AADCP).**

(1) One AN/VRC-47 and one AN/VRC-24 with remotes and headsets.

(2) One acetate-covered topographical map (1:250,000) of division area with 5-kilometer grid matrix superimposed.

(3) One manually constructed azimuth-determining/range-determining device (degrees and nautical miles).

(4) Two TA-312 phones with headsets.

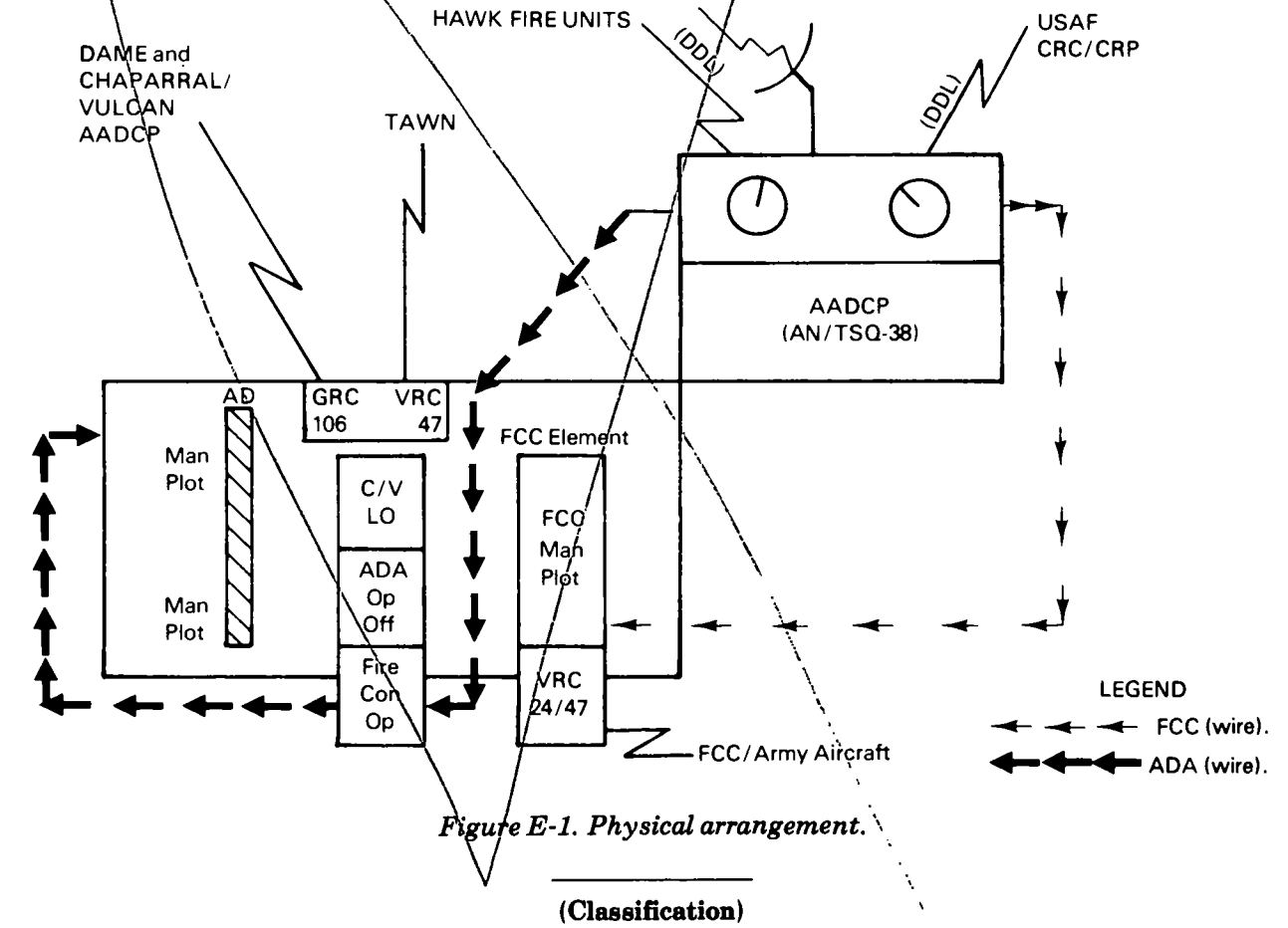

Figure E-1. Physical arrangement.

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ANNEX C (COMMUNICATIONS) TO SOP NO 1—3d Mech Div

1. **Purpose.** This annex identifies the normal communication networks that will support airspace management in the division AO.

2. **Applicability.** This annex applies to the units and stations (subscribers) that comprise the networks indicated. Unless otherwise indicated, the equipment required is organic to the using unit. Stations in the indicated nets that have no division airspace management functions are omitted.

3. **Responsibilities.** Subordinate unit commanders will insure that the stations/subscribers required for airspace management in the division AO operate in the networks indicated.

4. **Radio Nets.**

a. **Frequency Modulated (FM), Tactical.**

(1) **3d Avn Co command net.** This net is used for command and control of organic assets. Normally the division aviation officer at the DAME does not maintain a station in this net. However, when there is no other communication means available, the company may be required to provide radio-equipped liaison personnel at the DAME to insure continuous communications between the FCC and the DAME. See Appendix 1 (Division Airspace Management Radio Nets—Aviation).

(2) **1st Plat (ATC), 101st ATC Co (FWD), air traffic control nets.** These nets operate with FM, UHF, VHF, HF/SSB radios and are used for actual control of Army aircraft operating within the division AO. The principal station and net control station in these nets is the FCC. The FCC and the airfield terminal control section are the only ground stations normally operating in these nets. See Appendix 1 (Division Airspace Management Radio Nets—Aviation).

(3) **3d Mech Div aircraft terminal control net (FM, UHF, or VHF).** This radio net is used to transmit flight information regarding takeoff/landing for those aircraft using the division instrumented airfield. The airfield terminal control section is the principal ground station and net control station. See Appendix 1 (Division Airspace Management Radio Nets—Aviation).

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ANNEX C (COMMUNICATION) to SOP NO 1—3d Mech Div

(4) **Air defense Chaparral/Vulcan battalion command net.** This radio net is used for command and control of the battalion. It links the battalion commander, staff, firing batteries, radar platoon (forward area alerting radar), and the assistant air defense officer located at the DAME. When he has compatible equipment, the Chaparral/Vulcan battalion liaison officer, normally located at the Hawk AADCP, also enters this net. This net is the principal means for disseminating information regarding the control and disposition of battalion fire units. Subordinate elements of the battalion operate similar nets. See Appendix 2 (Division Airspace Management Radio Nets—Air Defense).

(5) **3d Mech Div FAAR target alert data display set (TADDS) data links.** Each of the eight FAAR sections organic to the ADA Chaparral/Vulcan battalion operates a broadcast-type FM radio frequency data link radio station to transmit digital data that displays location and tentative identification of aircraft over the division area on firing unit TADDS, including Chaparral/Vulcan and Redeye weapon systems. In the event of failure of the radio frequency data links, these nets have the capability for transmission of one-way voice signals, on a broadcast basis, to voice signal receivers in the TADDS. These nets may also be used in the voice mode to disseminate high priority air defense advisories/instructions other than digital identification and location area. See Appendix 2 (Division Airspace Management Radio Nets—Air Defense).

b. **Amplitude Modulated (AM) and Single-Sideband (SSB).**

(1) **Corps flight operations net (voice).** This net is operated by ATC elements supporting the corps to which the 3d Mech Div is assigned or attached. The net is used for aviation advisory information and coordination when an FOC is established. FCC operates a station in this net. When an FOC is not established at corps, the division FCC enters a similar net established by the supporting Air Force area CRC. See Appendix 1 (Division Airspace Management Radio Nets—Aviation).

(2) **ADA Chaparral/Vulcan battalion air defense liaison net (voice).** The ADA liaison net is a Chaparral/Vulcan battalion net connecting the battalion AD fire coordination officer at the direct support Hawk battalion and the Chaparral/Vulcan battalion's airspace management personnel (at the DAME) with the Chaparral/Vulcan battalion AADCP. See Appendix 2 (Division Airspace Management Radio Nets—Air Defense).

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ANNEX C (COMMUNICATION) to SOP NO 1—3d Mech Div

5. **Telephone Service, Sole-User.** Point-to-point telephone circuits are established between the installations and activities listed below in decreasing order of installation urgency. All circuits indicated are installed and maintained by the 3d Sig Bn, unless otherwise stated.

a. DAME to Chaparral/Vulcan AADCP.

b. DAME to FCC.

c. DAME to CAME (installed and maintained by corps signal elements).

d. DAME to Hawk AADCP.

e. Chaparral/Vulcan AADCP to Hawk AADCP (installed and maintained by supporting Hawk unit).

f. FCC to Hawk AADCP.

g. FCC to airfield/heliport operations section.

h. FCC to FOC (corps).

6. **Communications Redundancy.** The command and common-user telephone and teletype systems and tactical radio nets defined in the 3d Mech Div TSOP are used to supplement the specific communication services provided for airspace management. Use is made of existing communications for disseminating early warning information.

Appendixes: 1—Division Airspace Management Radio Nets—Aviation

2—Division Airspace Management Radio Nets—Air Defense

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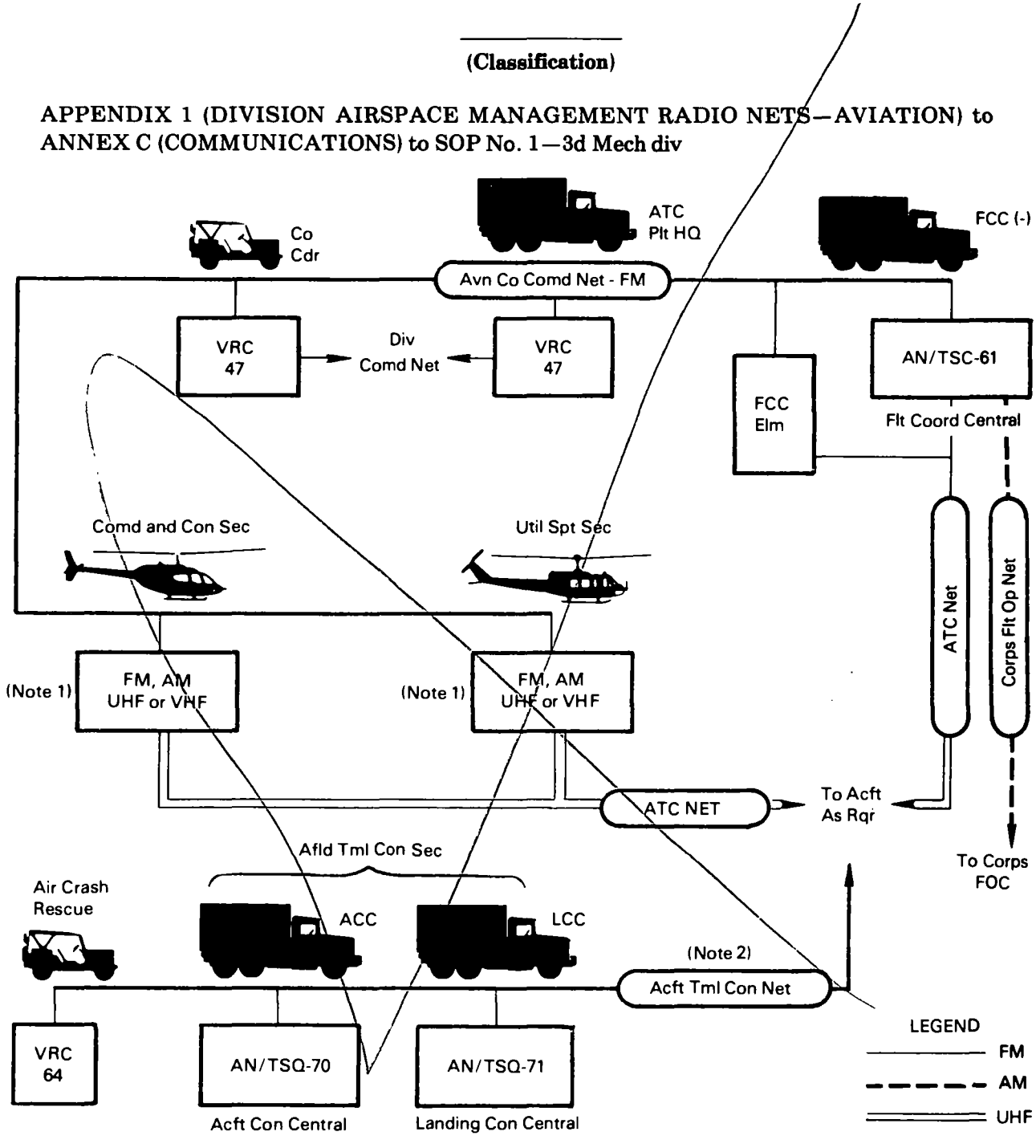
APPENDIX 1 (DIVISION AIRSPACE MANAGEMENT RADIO NETS—AVIATION) to ANNEX C (COMMUNICATIONS) to SOP No. 1—3d Mech div



NOTES: 1. Radios part of aircraft. Each aircraft has radio set AN/URC-10 for rescue operations.

2. FM, UHF, or VHF radio; IFF; and ground-controlled approach radar.

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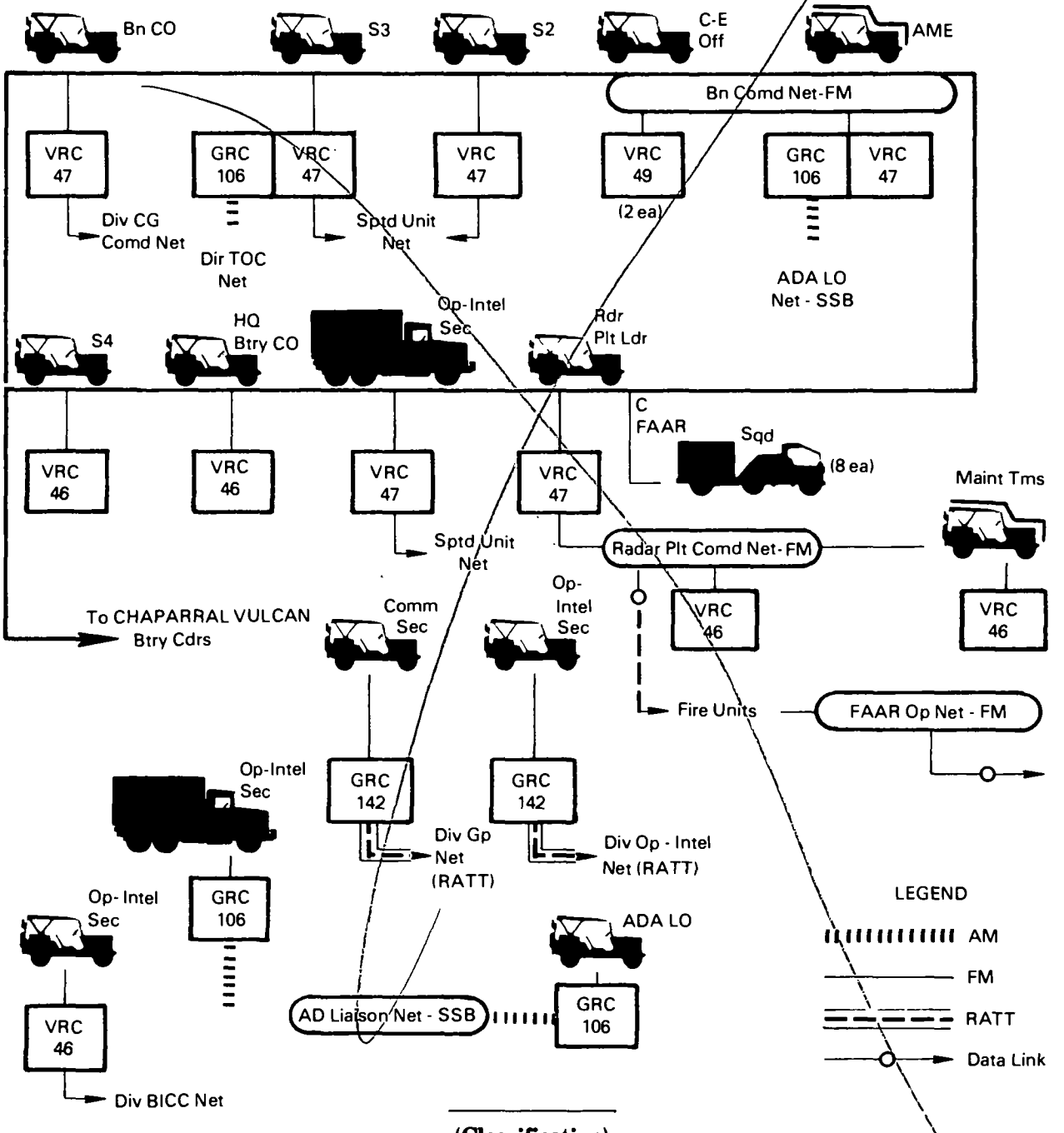
APPENDIX 2 (DIVISION AIRSPACE MANAGEMENT RADIO NETS—AIR DEFENSE) to ANNEX C (COMMUNICATIONS) to SOP No. 1—3d Mech Div



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APPENDIX F

EXAMPLE OF UNIT TACTICAL INSTRUMENT STANDING OPERATING PROCEDURES FOR ARMY AIR TRAFFIC

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1st Cbt Avn Bn
Camp Swampee
1 February 198__

STANDING OPERATING PROCEDURES
NO 12

TACTICAL INSTRUMENT PROCEDURES FOR ARMY AIR TRAFFIC

Section I

GENERAL

1. **References.**

a. 82d Aslt Hel Co Tactical SOP.

b. 1st Cbt Avn Bn Tactical SOP.

c. 25th Armd Div Army Air Traffic SOP.

d. FM 1-5, *Instrument Flying and Navigation for Army Aviators.*

e. FM 1-103, *Airspace Management and Army Air Traffic in a Combat Zone.*

2. **Purpose.** To establish procedures for the planning, conduct, and regulation of tactical instrument flight as part of Army air traffic in the forward area.

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(SOP NO 12—82d Aslt Hel Co)

3. **Concept.**

a. The corps airspace management element (CAME) develops and coordinates procedures for use of corps airspace. The division airspace management element (DAME) develops and coordinates procedures for the use of airspace directly under the control of the division.

b. The air traffic control (ATC) platoon's flight coordination center (FCC) provides standard and tactical instrument flight clearance and following when required.

c. Tactical teams organic, attached to, or under operational control (OPCON) of the ATC Company (FWD) may be deployed to forward locations to extend the flight coordinating and monitoring capability within the division. These mobile elements can collocate with tactical aviation sections/units in order to use their communications nets whenever necessary and whenever possible.

d. Aviation elements operating in forward battle areas may encounter instrument meteorological conditions (IMC) and be required to conduct tactical instrument flight even though beyond or outside the communication range of ATC elements.

e. Navigational aids (NAVAID) belonging to the tactical teams will be moved often to avoid enemy electronic detection and destruction and to provide rapid response to tactical instrument flight requirements. Close coordination is required to insure the mobile beacons are located and operated to best support a tactical instrument flight mission.

Section II

FLIGHT PLANNING

1. **Purpose.** This standing operating procedure (SOP) is established as a checklist to insure complete and thorough premission tactical instrument flight planning for Army air traffic.

2. **Operations.**

a. **Mission Requirements.** Analyze the mission to determine all inherent requirements. For example, a single or multiple aircraft or multiple sortie mission will affect the entire planning process. Determine air traffic control requirements necessary to support the mission.

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b. **Operations/Intelligence.**

(1) Obtain a current threat briefing from the operations officer. Check the "shot at" file to identify the most current enemy threat.

(2) Familiarize yourself thoroughly with locations, identifications, and postures of friendly units in your area of operation (AO).

c. **Frequencies and Call Signs.** Insure that Communications-Electronics Operation Instructions (CEOI) information is current and complete and NAVAIDs can be established and maintained where you need them.

d. **Weather Information.** Check weather information and forecast in the AO. Particular attention should be focused on wind information at point of departure, en route, and at the terminal points. Surface winds should be used. Division artillery can serve as a weather source in the absence of any other more formal sources.

3. **Map Study/Analysis.**

a. **Route Selection.** Conduct a detailed map study to determine the best possible route that contributes to mission accomplishment. Select primary, alternate, and return routes based on the following factors:

(1) Select the route which affords maximum concealment and masking from the air defense threat.

(2) Locate and plot prominent terrain features and obstacles.

(3) Determine and coordinate NAVAID requirements and flight clearances, with ATC elements, when possible. In the absence of an ATC facility, plan for clearing your own flight and arranging for flight-following with other aviation or ground units along the route. Early coordination and planning insure maximum reaction time for the forward ATC units.

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b. **Flight Altitudes.** Determine the minimum safe flight altitude for the selected routes. In the event an air traffic control or clearance facility is not available, you must be prepared to provide and insure your own terrain obstacle clearance. Map analysis is the primary source for determining altitude information.

(1) **Altimeter setting.** Insure the aircraft altimeter is set to the correct terrain elevation. Current altimeter setting information may not be available other than that obtained from map study and correlation with the aircraft location on the ground.

(2) **En route and approach minimums.** In the absence of standard, published en route and approach diagrams, map study determines clearance altitudes en route and letdown minimum altitudes at the approach. Use an en route and minimum descent altitude of *____feet above the highest obstacle (AHO) in the flight buffer zone for a safe tactical instrument minimum altitude.

c. **Navigation Preplanning.** Knowledge of the terrain throughout the AO is necessary in order to be able to cope with unexpected change during the flight.

d. **Refuel/Rearm Requirements.** Fuel requirements must be determined and plans made for intermediate refuel stops. Additionally, rearming considerations must be integrated into the plan as appropriate.

e. **Magnetic Conversion.** A significant error can result if you fail to convert grid azimuths to magnetic azimuths.

4. **Equipment Requirements.**

a. **Maps and Navigational Aids.** Conduct a complete inventory to insure all maps and NAVAIDs are present for the mission.

*See page 22-4, FM 1-5, *Instrument Flying and Navigation for Army Aviators,* for a discussion of recommended minimum en route altitude (MEA) and minimum descent altitude (MDA).

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b. **Aircraft Equipment.** Compute weight and balance, check performance charts, and secure special mission and survival equipment as necessary.

Section III

FLIGHT CLEARANCE AND FLIGHT-FOLLOWING

1. **Rear Area to Tactical Operations Area.** When flying from a rear area to a tactical operations area, the aviator maintains contact with the ATC facility as long as possible. He then assumes responsibility for making contact with other tactical forward units for flight-following.

2. **Tactical Operations Area to Rear Area.** The aviator serves as his own initial clearance authority and attempts to make contact with ATC elements en route. The flight should follow closely the previously planned and coordinated flight plan.

3. **Flight Initiated From Unit Heliport or Airfield.**

a. Clearance for tactical instrument flights is secured from the division FCC element through the company operations prior to takeoff if communications exist.

b. When radio contact is not possible or feasible, contact the ATC elements by land line prior to takeoff for flight filing and clearance. Land-line communication is normally possible through the switch at the next higher supported unit headquarters.

4. **Flight Originating From a Tactical Site.**

a. In the event tactical instrument flight is required from a forward tactical location, such as a forward arming and refueling point (FARP), and communication cannot be established with an ATC facility, the aviator must serve as his own initial clearance authority.

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b. As soon as practical after the flight is initiated, the aviator should attempt to establish radio contact with an ATC element or a ground tactical unit to relay the flight plan. He should follow the original tactical instrument plan as closely as possible until either direct contact with an ATC element is made or a ground unit relay is established.

5. **In-Flight Transition From Terrain Flying to Tactical Instrument Flight.** When the tactical mission requires the transition from visual flight to tactical instrument flight, the aviator must carefully analyze his map to select a route and altitude to provide obstacle and terrain avoidance.

a. Communication with an ATC element is not possible. The aviator serves as his own clearance authority until direct communication with an ATC element is made or contact with a ground unit relay is effected.

b. Communication with an ATC element is possible. Report location and intended flight plan. Maintain direct ATC communications as long as possible until flight termination. If en route communication is lost, follow the reported flight plan as closely as possible until contact is regained (either direct or through a relay) or the flight is terminated. If communications with an ATC element cannot be reestablished, flight-follow with a ground tactical unit.

6. **Flight in a Severe Electronic Warfare (EW) Threat or Radio Silence Environment.**

a. Of necessity, much of tactical flight will be conducted in a severe EW threat environment. To avoid electronic detection in forward areas, NAVAIDs must be restricted to operation only when they are to be used, and then only intermittently. In order to avoid detection and destruction, the electronic signature of NAVAIDs and aircraft must be kept to a minimum, thereby making radio silence a requisite for mission accomplishment.

b. Aviators will use land-line communication when available for coordinating and clearing tactical instrument flights with an ATC element prior to takeoff. If land-line communication is not possible, use secure radio channels. Close initial coordination with the ATC element is essential prior to initiating the flight to eliminate unnecessary radio communications during flight.

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c. During a radio silence environment, voice radio communications for navigation and flight-following is not possible. The aviator must coordinate in detail prior to takeoff when possible, serve as his own clearance authority during in-flight transitions from VMC to tactical instrument flight, and often operate without a flight-following facility or unit while en route.

Section IV

TYPICAL MISSIONS

1. **Corps Area to a Forward Brigade Location.**

a. A utility helicopter pilot plans the flight using the SOP checklist. He determines his routes, minimum flight altitudes, and navigational requirements. Flight planning is not limited only to Army-operated air traffic control facilities and navigational aids, but includes all available facilities that can support the flight. Coordination with the corps area flight operations center/flight coordination center (FOC/FCC) is effected to insure flight-following navigational aids are emplaced and operational in forward areas when needed. The request for instrument flight rules (IFR) clearance is relayed from the unit operations to the basefield terminal control. It is then relayed through the appropriate ATC facility, usually the FOC for Army requests, to the clearance authority which is the airspace management center located at the Air Force control and reporting center (CRC). The flight clearance is received and the aviator departs the base field.

b. En route, the aviator is initially monitored by the CRC and is under positive radar control. As he progresses forward, it is necessary to transition to a lower flight altitude to avoid enemy air defense detection and destruction. The flight is handed over from the CRC to an air traffic controller at the forward air control post (FACP). The FACP, an extension of the CRC, continues to provide him with positive radar control at the lower altitude.

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c. As the aviator progresses further forward, his altitude is reduced to avoid enemy detection; radar contact at the FACP is lost; and the aviator is told to contact the division FCC. The FCC, collocated at the direct support HAWK battalion operations center, has received the information concerning the flight from the FOC. The aviator contacts the FCC and is told that radar contact has been made by one of the HAWK unit's acquisition radar or identification, friend or foe (radar)/selective identification feature (IFF/SIF) systems. On request the FCC gives the aviator his present location, as determined by the Hawk radar contact, and provides other information concerning weather, air warnings, and status of navigational aids. The FCC may also provide radar vectoring using data from the Hawk radar.

d. Moving farther toward the front, the aviator descends to the MEA (previously determined from map study) to remain below the air defense threat. When contact with the FCC is lost, the aviator contacts the ATC tac team or the forward brigade tactical operations center (TOC) and requests weather conditions in the area and directs that the NAVAID be turned on.

e. After tracking inbound and arriving at the brigade location, the aviator initiates the preplanned approach to the portable nondirectional beacon. During descent to the minimum descent altitude, he breaks out of the low clouds and visually makes a landing. The aviator requests that the brigade TOC notify the DAME at the division main command post (CP) that the flight has been completed and requests the DAME relay information to the servicing FCC and the aircraft's parent unit.

2. **Forward Location to the Corps Rear.**

a. An assault helicopter pilot plans a flight from a forward location to the corps rear to a support maintenance facility. By conducting a thorough map reconnaissance, the aviator selects the route and determines the minimum en route altitude. Contact with the FCC cannot be made prior to takeoff, but communications with the forward supported TOC confirms the location and operation of a tactical team en route navigational beacon. The flight route is modified to use this beacon.

b. The aviator requests that the forward supported TOC relay his intended route of flight, altitudes and estimated departure time to the DAME. The DAME receives this information and coordinates it with other known aviation or air defense activities that may conflict with the

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flight. They also relay the flight information to the division FCC, who, in turn notifies the FOC. The FOC collocated with the CRC coordinates the proposed flight with the airspace management center (AMC) at the CRC. The AMC alerts the appropriate FACP to provide ATC service when radar contact is made. Meanwhile, the division FCC, collocated with the direct support Hawk battalion operations center, coordinates the planned flight with the radar console operator in the AN/TSQ-73 fire distribution central.

c. After executing an instrument takeoff into instrument IMC, the aviator flies at the minimum safe altitudes that insure terrain and obstacle clearance, yet minimizes the possibility of enemy air defense weapons detection and engagement. Early attempts to establish contact with an FCC element are not successful, but contact with the tac team or support TOC is maintained; and information is relayed to the division FCC direct or via the DAME.

d. As the assault helicopter proceeds farther toward the rear area, the aviator continuously selects a higher altitude to widen the safety margin above the terrain.

e. When contact is established with the division FCC and through Hawk radar contact, the aviator on request or for conflict avoidance is provided radar vectoring to a nondirectional radio beacon (NDB) located in the division rear. The FCC also provides the aviator his IFR clearance as relayed from the CRC through the FOC. As the flight progresses, the aviator is handed over from the FCC to the FOC. Radar vectoring to his destination, if required, may be provided by the FACP, control and reporting post (CRP), or CRC. At the termination airfield, a ground-controlled approach (GCA) may be initiated if visual conditions are not encountered.

Section V

COMPANY OPERATIONS FUNCTIONS, RESPONSIBILITIES, AND COORDINATION

1. **Functions.** Provide operational flight planning assistance and information to company aviators planning and conducting tactical instrument flight.

a. Determine ATC requirements necessary to support the unit mission or a specific flight.

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b. Maintain a current operations/intelligence threat briefing for company aviators to be used in flight planning.

c. Insure current ATC element and tactical unit CEOI information is posted.

d. Maintain an up-to-date NAVAID availability status for use in planning tactical instrument flight routes.

e. Maintain a current weather chart.

f. Maintain the current altimeter setting and insure that it is available in the tactical unit command post.

g. Maintain a reserve of tactical maps of the AO with prominent terrain and obstacles marked for use in planning tactical instrument flights.

2. **Responsibilities.** Provide the primary and initial point of contact with the division FCC element to coordinate tactical instrument flight plans and clearance.

a. Establish and maintain a communication link with the division ATC elements.

(1) Use existing land-line nets where possible to coordinate flight plans and clearances. Normally, land-line communication links through the next higher supported unit provide a connection with the division FCC element.

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(2) If land-line communication is not possible, use secure radio channels to operationally control division ATC elements. Use relays through adjacent units when necessary.

b. Coordinate flight plans and clearances to support the unit mission or a specific flight plan.

(1) Contact and obtain flight clearance from division FCC elements when possible.

(2) Coordinate with adjacent units to relay flight information to division FCC elements when necessary.

3. **Coordination.** Coordinate placement and use of navigational aids and flight-following.

a. Coordinate with division FCC elements for the placement and relocation (if necessary) of tactical team NAVAIDs or beacons as necessary to support the unit mission or a specific tactical instrument flight.

b. Coordinate with ATC elements and other tactical units, both air and ground, as necessary, to provide flight-following and the local altimeter setting for the unit or a specific flight.

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Commanding

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GLOSSARY

Terms

Airspace control—a service provided within the combat zone to contribute to the maximization of combat effectiveness by promoting the safe, efficient, and flexible use of airspace. Airspace control is provided in order to permit flexibility of actions in controlled airspace, while authority to approve, disapprove, or deny combat operations is vested only in the joint force commander.

Airspace control area—airspace which is laterally defined by the boundaries of a joint force area of operations. The airspace control area may be subdivided into airspace control sectors.

Airspace control authority (ACA)—a service component commander, designated by the joint force commander to plan and coordinate airspace control matters with responsibility for the operation of the airspace control system in the airspace control area. As used in this manual, the airspace control authority is the Air Force Component Commander/ Commander, Air Force Forces.

Airspace control boundary—the lateral limits of an airspace control area, airspace control sector, airspace restriction, or high density airspace control zone.

Airspace control center (ACC)—an element within the tactical air control center, which includes component service liaison, responsible for planning and establishing rules and procedures for the coordinated and integrated use of the airspace by all component forces.

Airspace control facility—any of the several service component facilities which provides airspace control in the combat zone. As used in this manual, airspace control facilities include the airspace control center, airspace management center, air traffic control facilities, airspace management elements, air defense command posts, and other elements of the tactical air control system.

Airspace control sector—a subdivision of the airspace control area, designated by the airspace control authority in consideration of Service component airspace control capabilities and requirements.

Airspace control sector authority—that individual designated by the airspace control authority as coordinating authority for airspace control within an airspace control sector.

Airspace control system—a system consisting of the organization, personnel, facilities, policies, and procedures required to prevent collisions between aircraft, aircraft and obstructions to flight, and aircraft and surface-launched weapons; and to contribute to the maximizing of combat effectiveness by promoting the safe, efficient, and flexible use of airspace.

Airspace management—the coordination, integration, and regulation of the use of airspace of defined dimensions.

Airspace management center (AMC)—an element within a control and reporting center, which includes component Service liaison. Responsible for continuous coordination, regulation, and integration of component Services' air operations, in accordance with the coordinated rules and procedures established by the airspace control center.

Airspace management liaison section (AMLS)—an agency staffed with representatives from all Service components involved, responsible to the airspace control authority for planning, coordinating, and integrating activities related to airspace control.

Airspace restricted area—airspace of defined dimensions, designated by the airspace control authority, in response to specific operational situations/requirements within which the flight of aircraft is restricted in accordance with certain specified conditions.

Airspace restrictions—special restrictive measures applied to segments of airspace of defined dimensions.

Air traffic control facility—any of the Service component airspace control facilities that may be involved in control of air traffic in an area of operations.

Air traffic identification—the use of electronic devices, operational procedures, visual observation, and/or flight plan correlation for the purpose of identifying and locating aircraft flying within the airspace control area.

Coordinating altitude—an airspace management procedure, for use within airspace of defined dimensions, designed to reduce conflict between fixed wing and rotary wing aircraft.

High density airspace control zone—airspace of defined dimensions, designated by the airspace control authority, in which there is a concentrated employment of numerous and varied weapons.

Instrument meteorological conditions (IMC)—meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling, less than the minima specified for visual meteorological conditions.

Low-level transit routes (LLTR)—a temporary corridor of defined dimensions passing in either direction through the areas of organic low-level air defenses of surface forces, in an HIDACZ, or restricted operations area.

Minimum risk routes (MRR)—temporary routes of flight, recommended for Air Force use, presenting the minimum known hazards to low-flying aircraft transiting the tactical operations area.

Positive control—the operation of air traffic in a radar/nonradar control environment in which positive identification, tracking, and direction of aircraft within an airspace is conducted by an agency having the authority and responsibility therein.

Procedural control—a type of airspace control which is accomplished by nonelectronic means.

Rear operations area—that area rearward of the tactical operations area rear boundary where airspace control is more definitive. Dimensions are as directed by the joint force commander.

Restricted operations area—airspace of defined dimensions, designated by the airspace control authority (ACA), in response to specific operational situations/requirements within which the operation of one or more airspace users is restricted.

Tactical operations area—that area between the fire support coordination line and the rear operations area where maximum flexibility in the use of airspace is needed to assure mission accomplishment. The rear boundary of the tactical operations area should normally be at or near the rear boundary of the front line divisions.

Visual meteorological conditions (VMC)—meteorological conditions expressed in terms of visibility, cloud distance, and ceiling, equal to or better than specified minima.

Abbreviations and Brevity Codes

A

AADC	area air defense commander
AADCP	Army Air Defense Command Post
ABCCC	airborne battlefield command and control center
ACA	airspace control authority
ACC	airspace control center
ADA	air defense artillery
AFCC	Air Force component commander
AGL	above ground level
AHO	above the highest obstacle
AM	amplitude modulated
AMC	airspace management center
AME	airspace management element
AMLS	airspace management liaison section
ANX	annex

AO	area of operations
ASOC	air support operations center
ASRT	air support radar team
ATC	air traffic control
AWACS	airborne warning and control system
B	
BCE	battle coordination element
C	
CAME	corps airspace management element
CEOI	Communications-Electronics Operation Instructions
CEWI	combat electronic warfare intelligence
CFA	cover force area
CIC	combat intelligence center
COMAFFOR	Commander, Air Force Forces
COMM	communications
COMMZ	communications zone
CONUS	Continental United States
COSCOM	corps support command
CP	command post
CPX	command post exercise

CRC	control and reporting center
CRP	control and reporting post
CTOC	corps tactical operations center

D

DAME	division airspace management element
DTOC	division tactical operations center

E

EAC	echelon(s) above corps
ELM	element
EW	electronic warfare

F

FAA	Federal Aviation Administration
FAAR	forward area alerting radar
FACP	forward air control post
FARP	forward arming and refueling point
FCC	flight coordination center
FDC	fire direction center
FLOT	front line of own troops
FM	frequency modulated
FOC	flight operations center

FTX	field training exercise
FWD	forward
G	
GCA	ground-controlled approach
GS	general support
H	
HF	high frequency
Hz	hertz
I	
IFF	identification, friend or foe (radar)
IFR	instrument flight rules
IMC	instrument meteorological conditions
INTR	integration
L	
LC	line of contact
LLTR	low-level transit route(s)
LO	liaison officer
M	
MBA	main battle area
MDA	minimum descent altitude

MEA	minimum en route altitude
Mech	mechanized
MHz	megahertz
MRR	minimum risk route(s)
MSL	mean sea level
N	
NAVAID	navigational aid
NDB	nondirectional radio beacon
NM	nautical mile
NOE	nap-of-the-earth
NOTAM	notice to airmen
O	
OPCON	operational control
OPORD	operation order
P	
POL	petroleum, oils and lubricants
R	
RATT	radio teletypewriter
ROA	restricted operations area

RPV	remotely piloted vehicles
S	
SAR	search and rescue
SEAD	suppression of enemy air defense
SHORAD	short-range air defense
SIF	selective identification feature (used with IFF)
SOP	standing operating procedure
SSB	single side band
T	
TACC	tactical air control center
TACS	tactical air control system
TADDS	target alert data displays
TAF	tactical air force
TOC	tactical operations center
TOE	table(s) of organization and equipment
TSOP	tactical standing operating procedure
U	
UHF	ultra high frequency
USAAVNC	United States Army Aviation Center

V

VFR	visual flight rules
VHF	very high frequency
VMC	visual meteorological conditions

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By Order of the Secretary of the Army:

E. C. MEYER
General, United States Army
Chief of Staff

Official:

ROBERT M. JOYCE
Brigadier General, United States Army
The Adjutant General

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